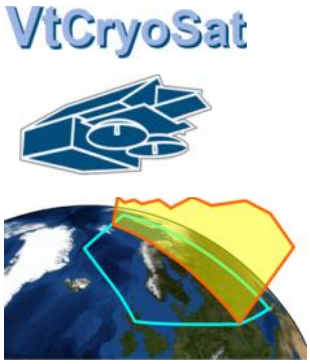


CryoSat Web Client application

User's Manual

	name function company	date signature
prepared by	Guillaume AUREL *Engineer* VisioTerra *Guillaume.Aurel@visioterra.fr*	
checked by	Grégory MAZABRAUD *Engineer* VisioTerra *Gregory.Mazabraud@visioterra.fr*	
approved by	Serge RIAZANOFF *Director* VisioTerra *Serge.Riazanoff@visioterra.com*	

DOCUMENT STATUS SHEET

Issue	Date	Comments	Author
1.0	14/04/2014	Draft 01 - Creation of the document	G. Aurel
1.0	08/04/2014	Draft 02 - Modifications according to updated user interface	G. Aurel
1.0	14/04/2014	Draft 03 - Modifications according to updated VtWeb user manual	G. Aurel
1.0	14/04/2014	First release delivered to T. Parrinello	G. Aurel
1.1	15/04/2014	Draft 01 - Logo changed and some figures added	G. Aurel
1.1	23/04/2014	Draft 02 - Review of the document	S. Riazanoff
1.1	25/05/2014	Draft 03 - Modifications made according to the review comments.	G. Aurel
1.1	26/05/2014	Second release delivered to T. Parrinello	G. Aurel
1.2	17/06/2014	Draft 01 - Modifications made according to T. Parrinello's comments	G. Aurel
1.2	24/06/2014	Draft 02 - Some parts have been rewritten for an easier reading	H. Charbit
1.2	24/06/2014	Draft 03 - Review of the modifications.	G. Aurel
1.2	25/06/2014	Third release delivered to T. Parrinello	G. Aurel
1.3	01/07/2014	Draft 01 - Addition of real screen captures	G. Aurel
1.3	01/07/2014	Fourth release delivered to T. Parrinello	G. Aurel
1.4	15/07/2014	Draft 01 - Sections relative to VtWeb rather than VtCryoSat moved in annex as asked by T. Parrinello.	G. Aurel
1.4	19/09/2014	Fifth release delivered to T. Parrinello.	G. Aurel
1.5	26/09/2014	Draft 01 - Screen captures updated with the new interface, background layers updated, download capabilities updated, kml edition added, reset capabilities added.	G. Aurel
1.5	26/09/2014	Sixth release delivered to T. Parrinello.	G. Aurel
1.6	05/12/2014	Draft 01 - Added a section showing how to enable WebGl on Safari in 2.4.1 Setting the 2D/3D view, more detailed nomenclature of products in 3.2 List of CryoSat products.	G. Aurel
1.6	05/12/2014	Seventh release delivered to T. Parrinello.	G. Aurel
1.7	29/01/2015	Draft 01 - Update for VtCryoSat 1.3.	G. Aurel
1.7	29/01/2015	Eighth release delivered to T. Parrinello.	G. Aurel
1.8	13/02/2015	Ninth release delivered to T. Parrinello, updated for VtCryoSat 1.4.	G. Aurel
1.9	24/02/2015	Tenth release delivered to T. Parrinello, modified according to his comments received on the 24/02/2015.	G. Aurel

TABLE OF CONTENTS

LIST OF FIGURES

1 PURPOSE

VtCryoSat is an application designed to filter CryoSat data, display them on a virtual globe, easily download them as a KML file and download products directly from the CryoSat dissemination server. VtCryoSat is intended to work with the use of a recent web browser and doesn't require any software or plug-in installation.

In order to search data, the user needs to specify an Area Of Interest (AOI), a time interval, and a dataset.

Once CryoSat products have been listed, they can be displayed on the layer stack. The physical measure, its scale and the display colour of the selected data can be set according to the user's needs and will then appear on the VtWeb virtual globe. Following the same criteria, a KML export of the same measure can also be downloaded.

Afterwards, ESA-allowed users can download the product data in the Level 1b (L1b), Level 2 (L2) and Geophysical Data Record (GDR) product levels by using their login password which will give VtCryoSat access to the ESA CryoSat dissemination server ftp://science-pds.cryosat.esa.int.

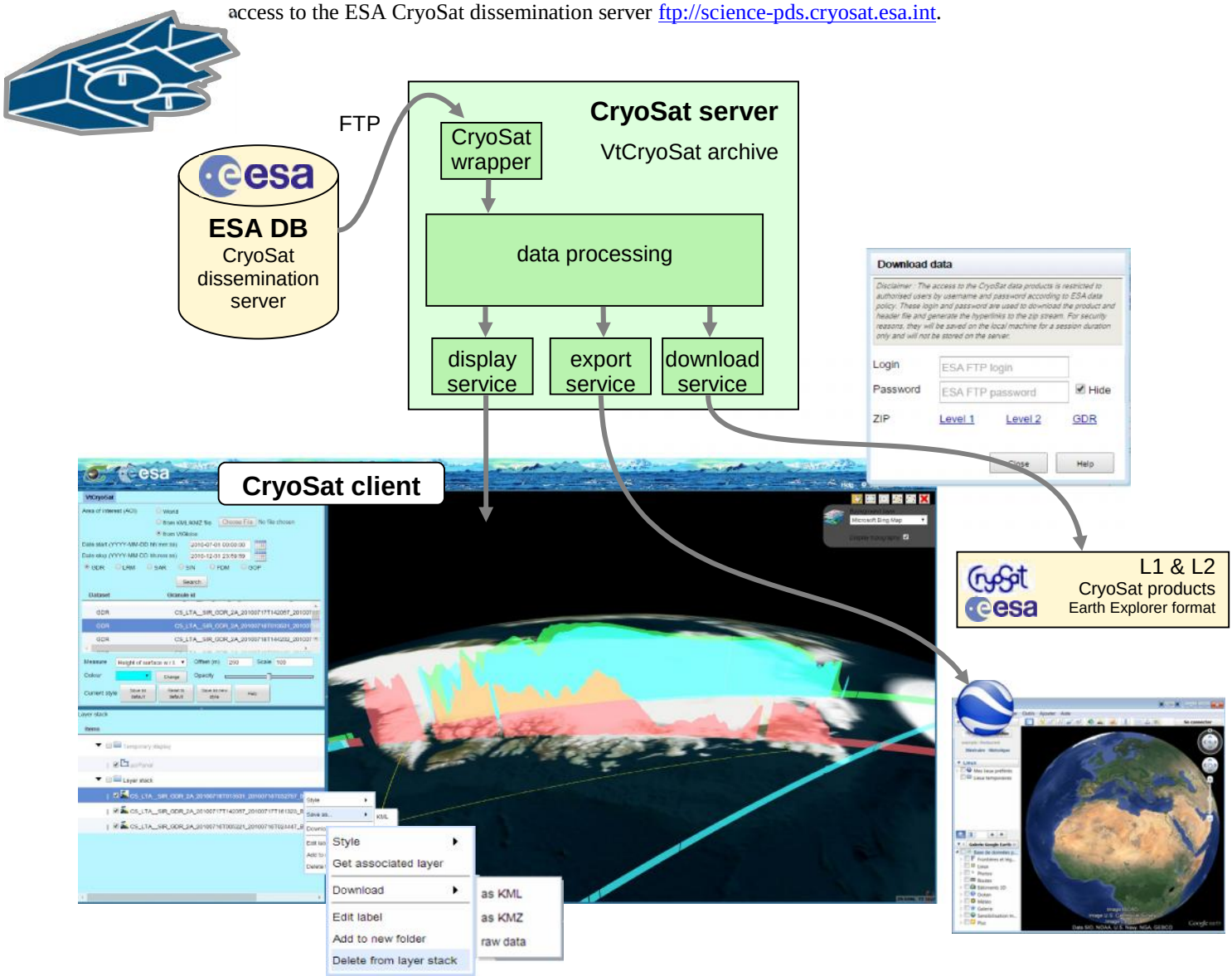


fig. 1 - CryoSat client-server architecture.

2 THE VTWEB PLATFORM

2.1 VtWeb client-server architecture

The application can be accessed via a recent Web-browser such as Internet Explorer (Microsoft™), Chrome (Google™), Firefox (Mozilla™), Opera (Opera Software™) or Safari (Apple™). It can also be accessed through a KML file exported by the "VtWeb client" (see section 2.3.3.3).

The "VtWeb client" main window is composed of the panels shown in below. Each panel is described in the sub-sections hereafter.

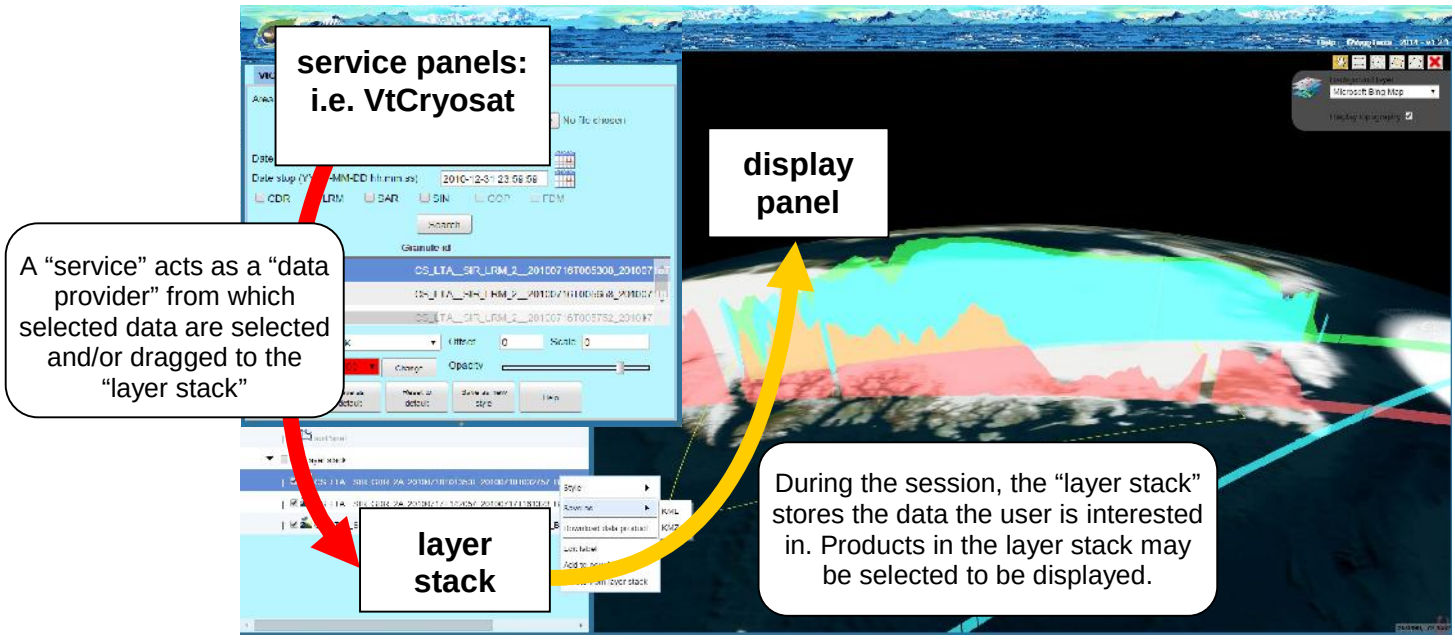


fig. 2 - The "VtWeb client" main interface.

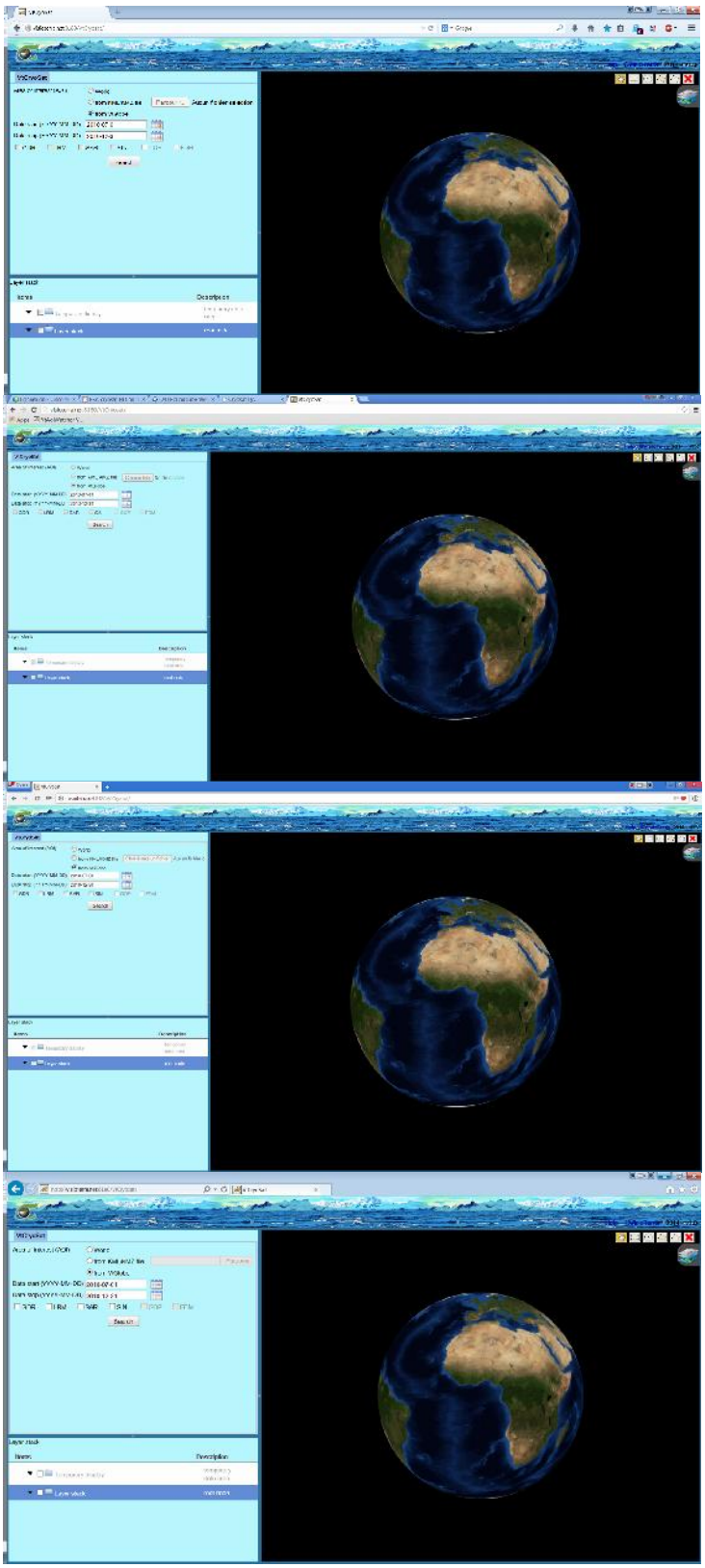


fig. 3 - "VtWeb client" shown using Firefox, Chrome, Opera and Internet Explorer.

2.2 Service panel(s)

This panel depends on the service(s) available for this application and may contain the interface for these different services. **VtCryoSat** is the service object of the present document and is detailed in section 3 but examples may use the VtAoiWatcher which is already running.

2.3 Layer stack

The layer stack contains the list of all the items that can be displayed in the display panel.

Items in the layer stack will be processed in the order they are organized: the one at the top of the list will be the last to be drawn.

2.3.1 Temporary / Voluntary display

2.3.1.1 Temporary display

When items of the list are browsed in the VtCryoSat service panel, they are temporarily displayed in the layer stack and therefore they shall appear in the display area.

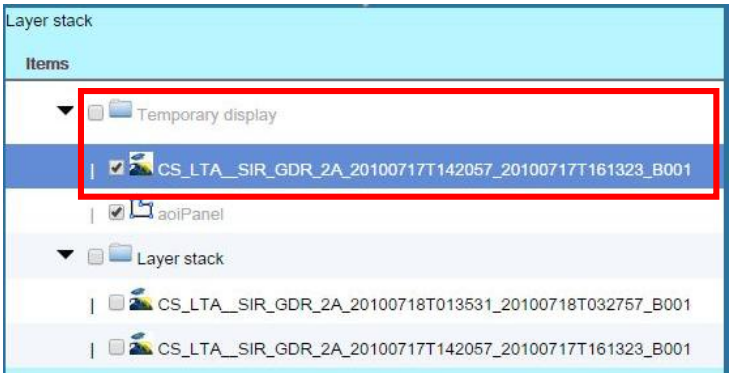


fig. 4 - Layer stack – Temporary display.

2.3.1.2 Voluntary display

When items are selected to be displayed in the VtCryosat service panel, they are added to the layer stack (to display an item, click on "**Add to layer stack**" in the context menu or double-click on the item).

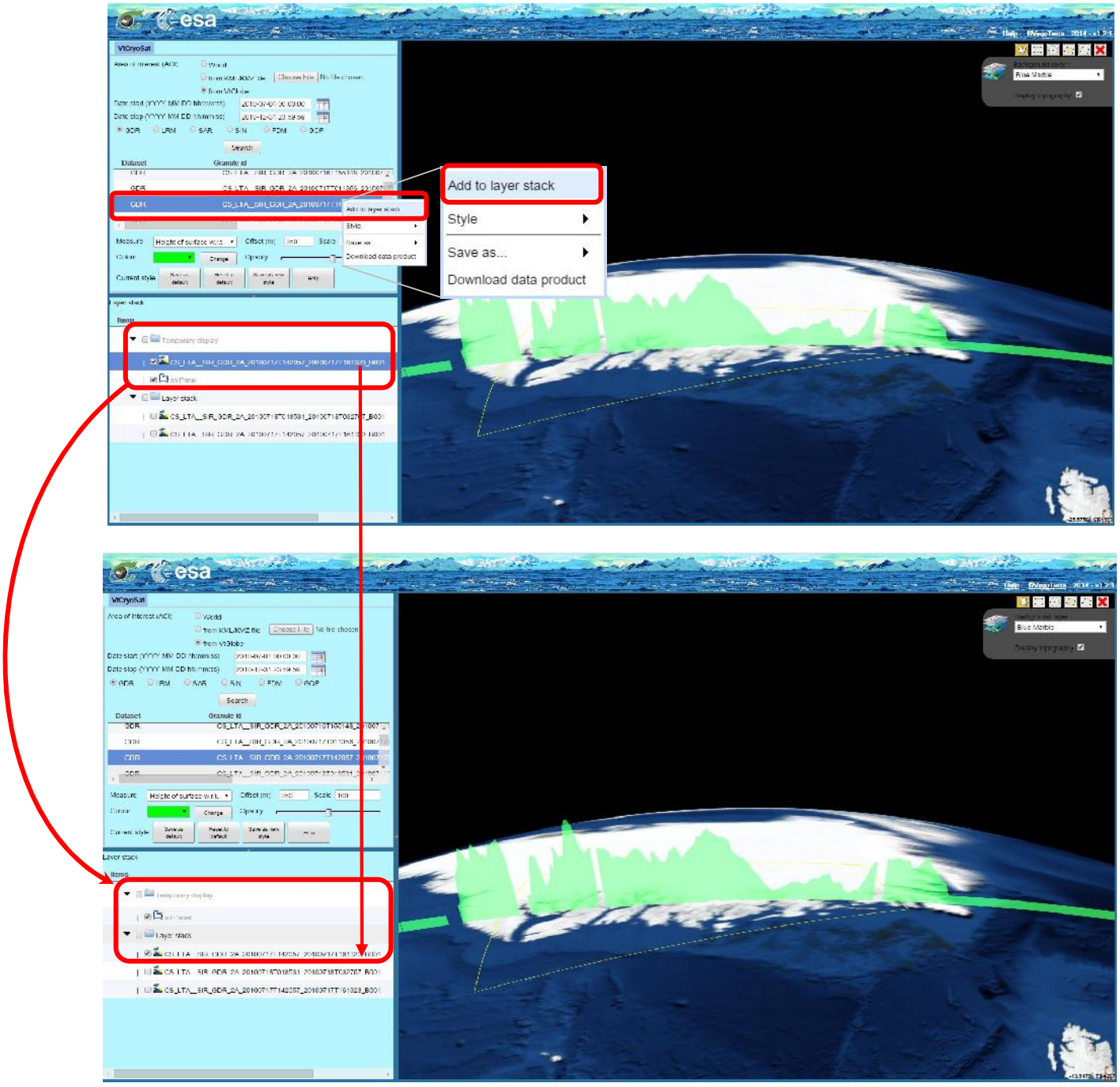


fig. 5 - Layer stack – Voluntary display.

2.3.2 Structure

2.3.2.1 Creating folders

The layer stack can be organized with folders that can be created in two different ways:

- Right-click on an existing folder and select "**Create folder**" option.
- Right-click on a layer and select "**Add to a new folder**" option. This way directly moves the selected layer in the new folder.
- Right-click on a layer and select the "Add to a new folder" option. In that way, the layer is directly moved to the new folder.

In the example here below, the "SAR" folder has been added.

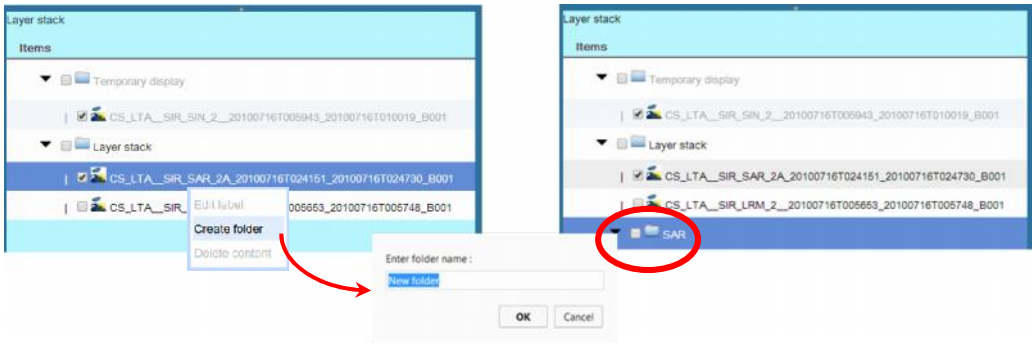


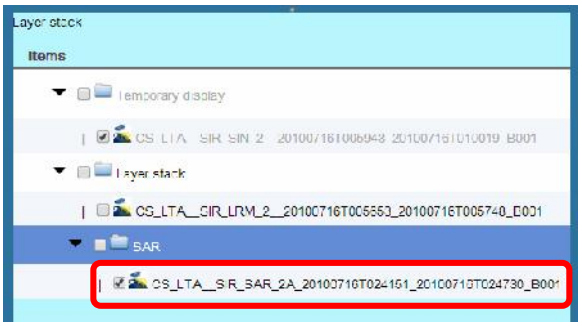
fig. 6 - Layer stack – Creating folders.

2.3.2.2 Moving items in the layer stack

Any items or group of items can be **moved** across the layer stack by "**drag-and-drop**".

In the example here attached, the CryoSat SAR layer has been stored in the "SAR" folder, created in the previous section.

Note that the display order will change according to the order of the layers in the stack.



2.3.2.3 Renaming items

To rename folders, click on them and select the "**Edit label**" option.

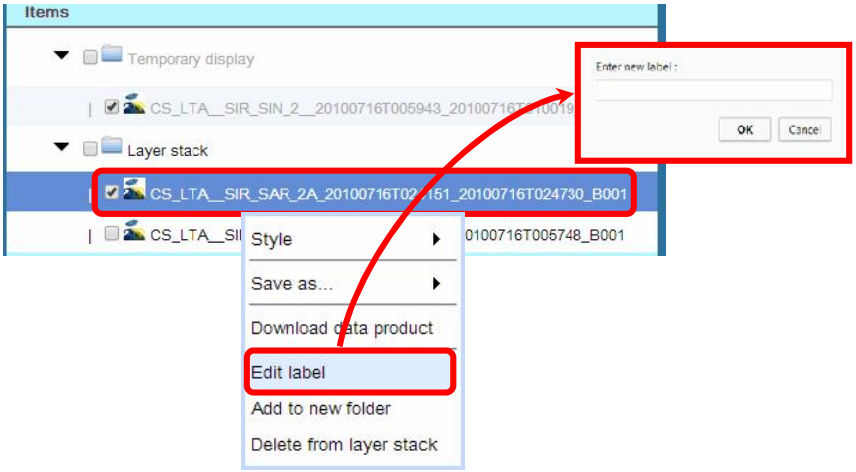


fig. 7 - Layer Stack – Edit a layer's label.

2.3.2.4 Deleting items

Any items or group of items can be deleted from the layer stack by selecting the "**Delete from layer stack**" option of the context menu.

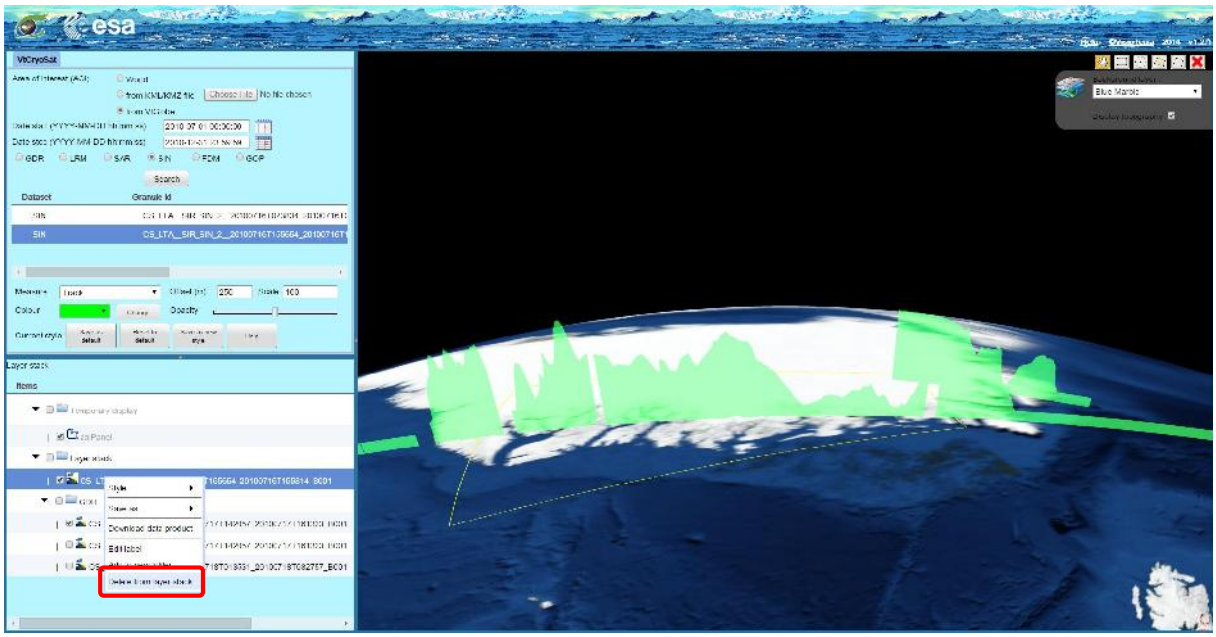


fig. 8 - Layer Stack – Deleting an object from the layer stack.

2.3.3 Display capabilities

2.3.3.1 Setting the display on / off

The display of the items, or group of items if the node represents a folder, is controlled by square check-boxes (☑ or ☐). In order to have items displayed, check the corresponding boxes.

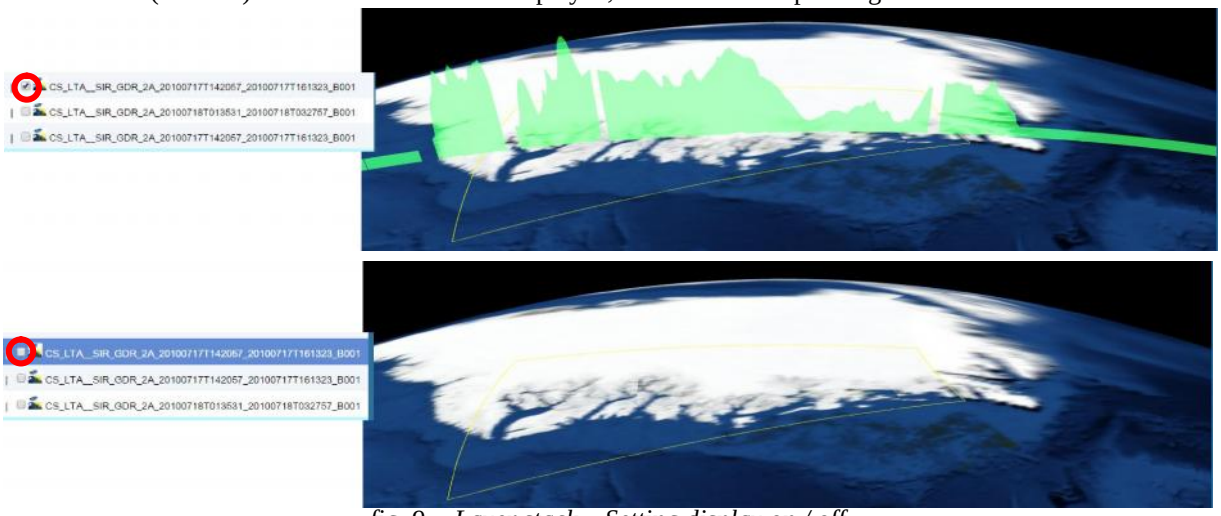


fig. 9 - Layer stack – Setting display on / off.

2.3.3.2 Selecting a style

Users can select a style for a layer. Styles are defined by rendering parameters explained in section A.2.3 and are valid for a dataset. A set of styles is predefined for each dataset.

For each dataset, one can

- create a new style,
- view or edit an existing style,
- copy an existing style,
- change the default style.

Applying a style to a layer

From the layer stack, users may apply a style to a layer by right-clicking on this layer and selecting a style in the "**Style**" menu. Please, note that the style is processed "on the fly" (see section A.2.2).

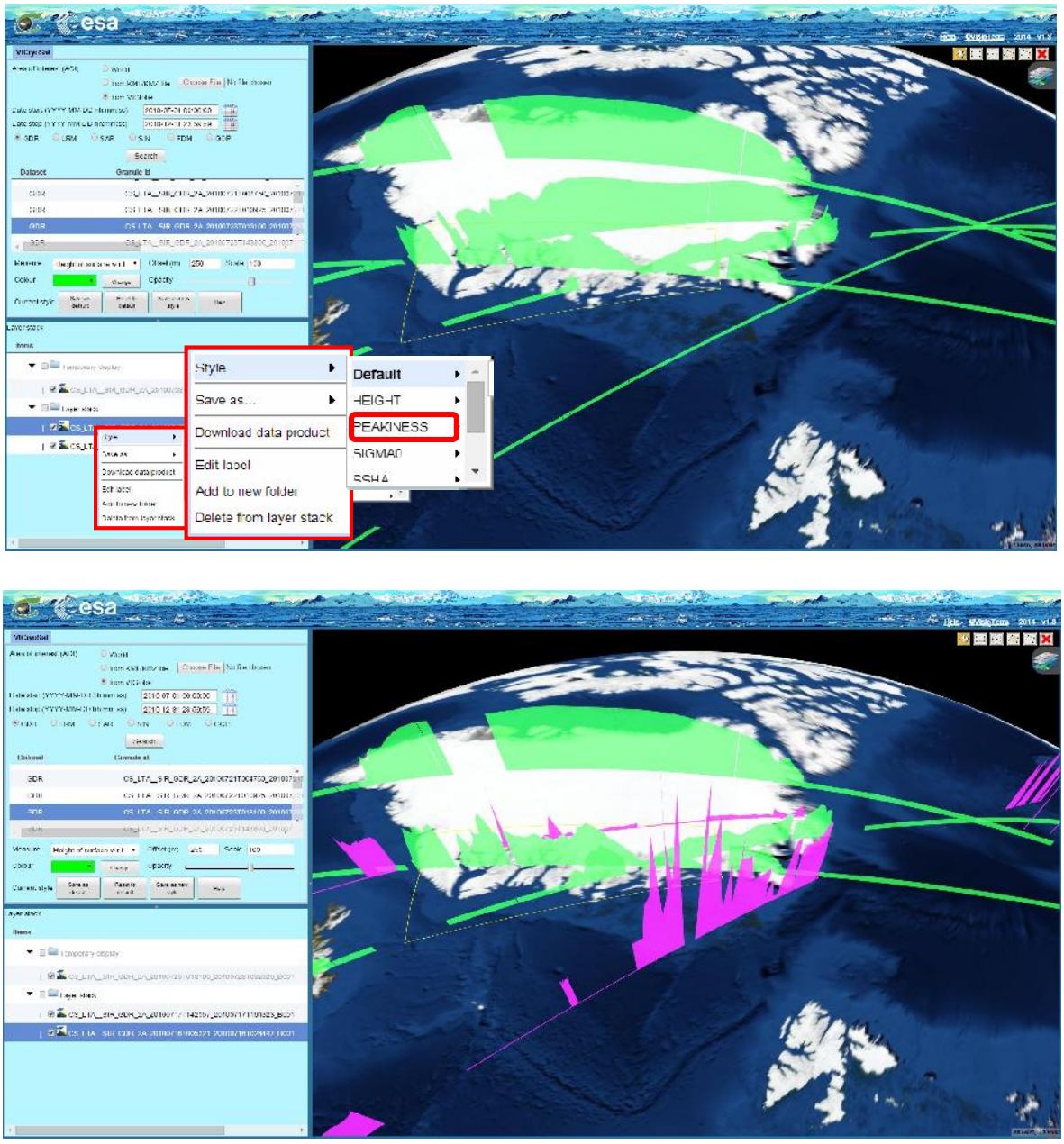


fig. 10 - Layer stack – Selecting a style.

Creating a style

For all datasets, there exists at least one **predefined style** which **cannot be changed** by the user. To set custom rendering parameters, the user has to **create a new style** or **edit a copy** of a predefined style. The new style will be available for the layer's dataset.

Default style

A **default style** is a pointer to an existing style (predefined or user defined). Users can change the default style by selecting another radio-button in the list of style as can be seen below.

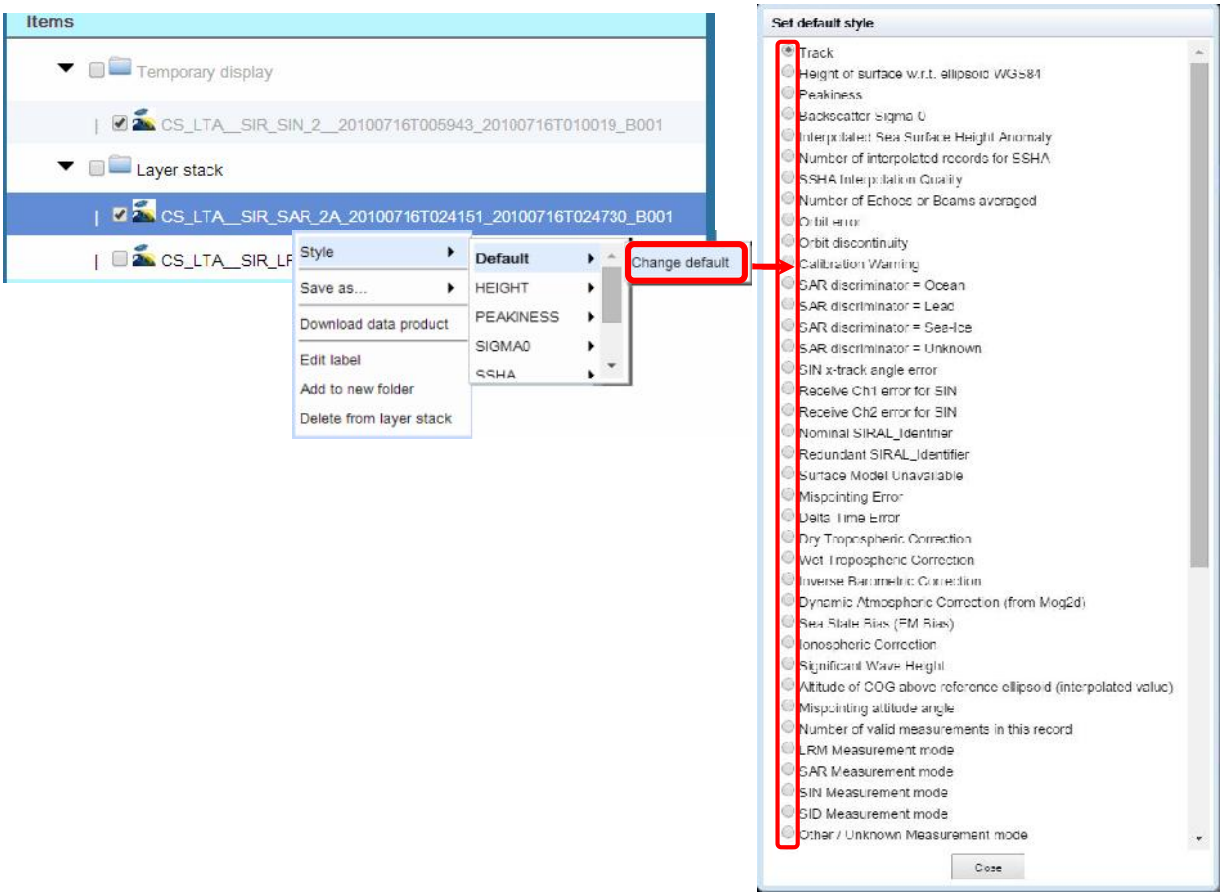


fig. 11 - Layer stack – Changing default style.

2.3.3.3 Style of an uploaded kml

The style of an uploaded kml can be edited using by right-clicking the kml name in the layerstack. Then one has to select "**Edit style**" which opens a specific window. The user can edit the colour and the opacity of the rendering using the controls.

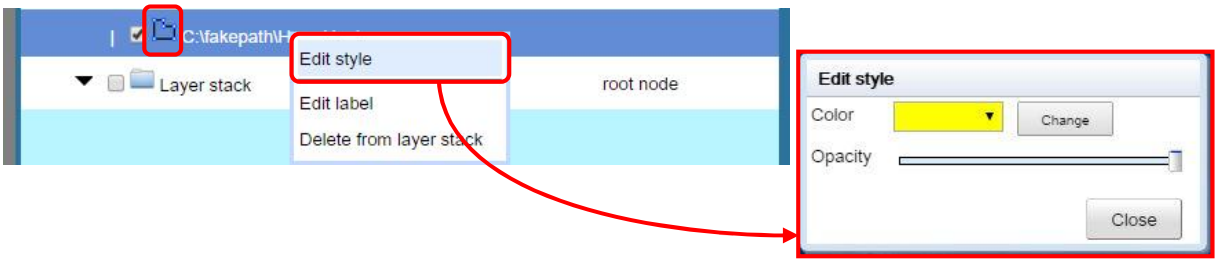


fig. 12 - Layer stack – Changing an uploaded kml style.

2.3.4 Export capabilities

It is possible to export any layer that is in the layer stack by right-clicking on it to open the context menu and by selecting the "**Save as**" option.

Note that the layer is downloaded with the style associated to it.

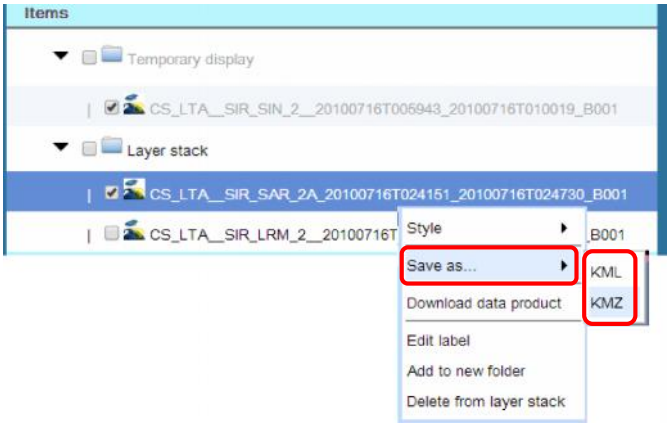


fig. 13 - Layer stack – Download menu in the layer stack's context menu.

There are two ways of exporting layers:

- **KML** - By pressing "**as KML**" option, a light KML file is produced with dynamic links to display the layer in Google Earth. Such a display requires a connection to the server.
- **KMZ** - By pressing "**as KMZ**" option, a heavy KMZ file is produced that contains all the data to be displayed on Google Earth without any connection to the server.

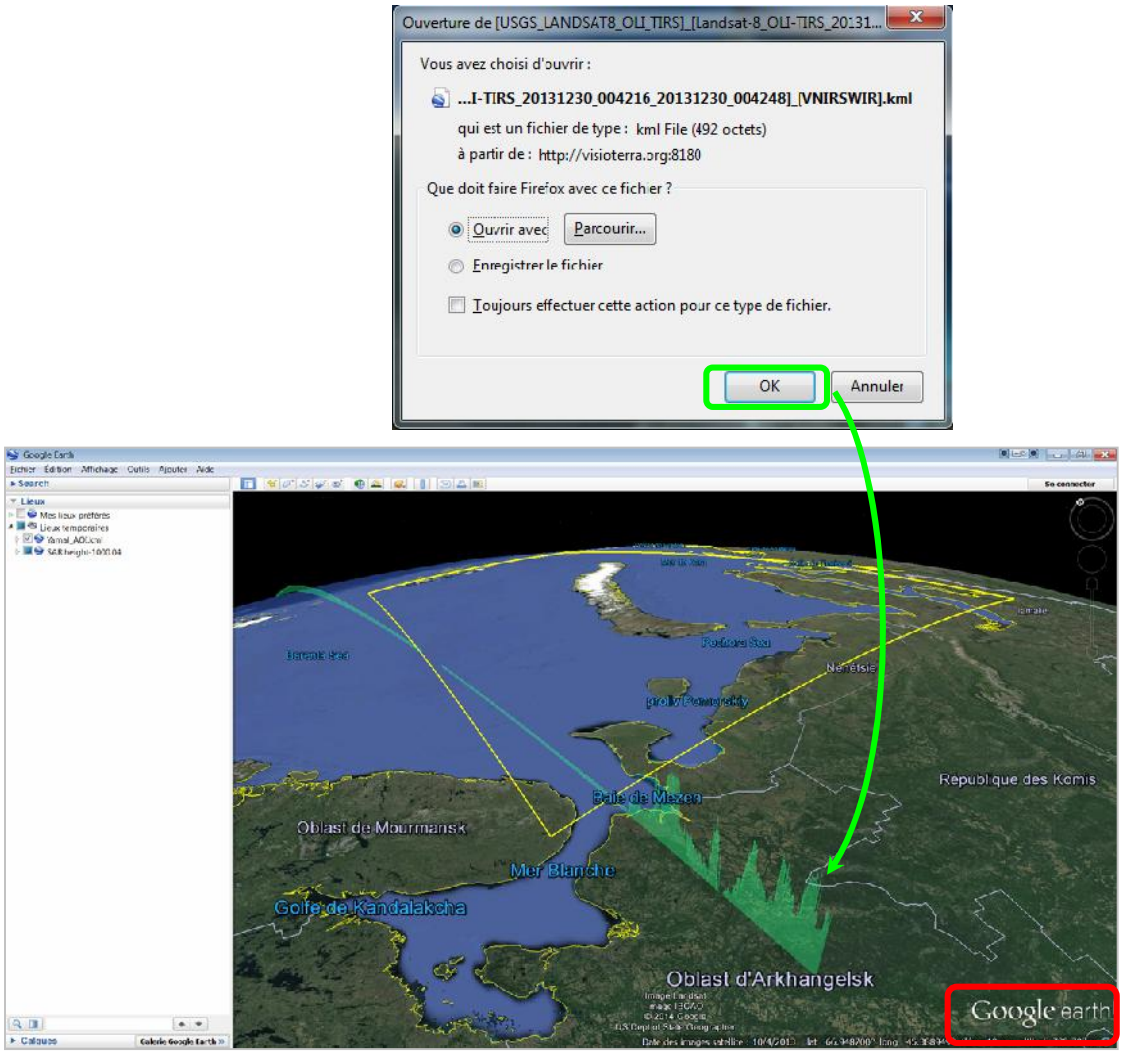


fig. 14 - Layer Stack – Example of export "as KML" seen in Google Earth (bottom).

2.3.5 Product data download

It is possible to download the original product data associated to any layer that is in the layer stack by right-clicking on it to open the context menu and by selecting the "**Download**" option.

After import, a new "folder" is created in the layer stack with the origin and associated layers. This folder has the name of the origin layer.

2.4 Display panel

2.4.1 Setting the 2D/3D views

By default, VtCryoSat uses the 3D view. The "**Mapping**" option of the "**Display**" tab in the "**Options**" item of the "**Tools**" menu enables to permute the 2D and the 3D displays. A shortcut "**Ctrl + M**" is defined to switch between 2D view and 3D view.

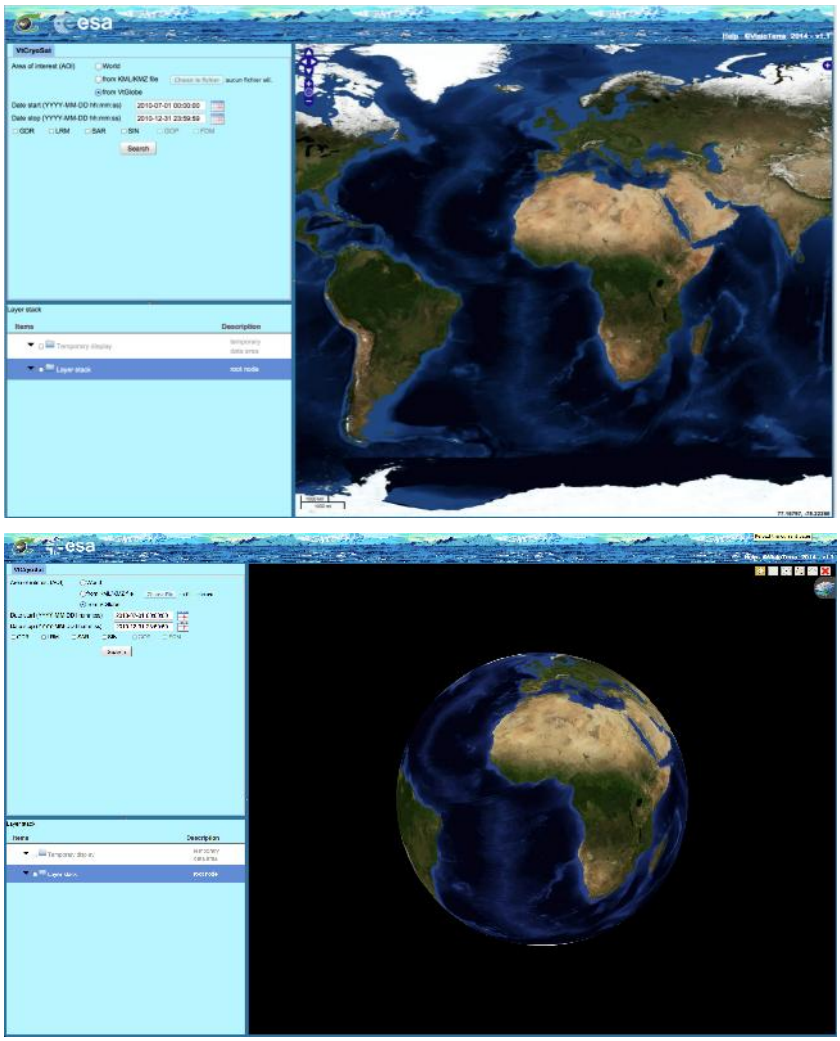


fig. 15 - Switching from 2D (top) to 3D (bottom) displays.

If the WebGl is set to disabled on the chosen web browser, a warning message may appear when charging the VtCryoSat URL indicating WebGl is not enabled as shown on Safari below. Then the VtCryoSat interface appears but the display area shows a 2D map instead if a 3D globe.

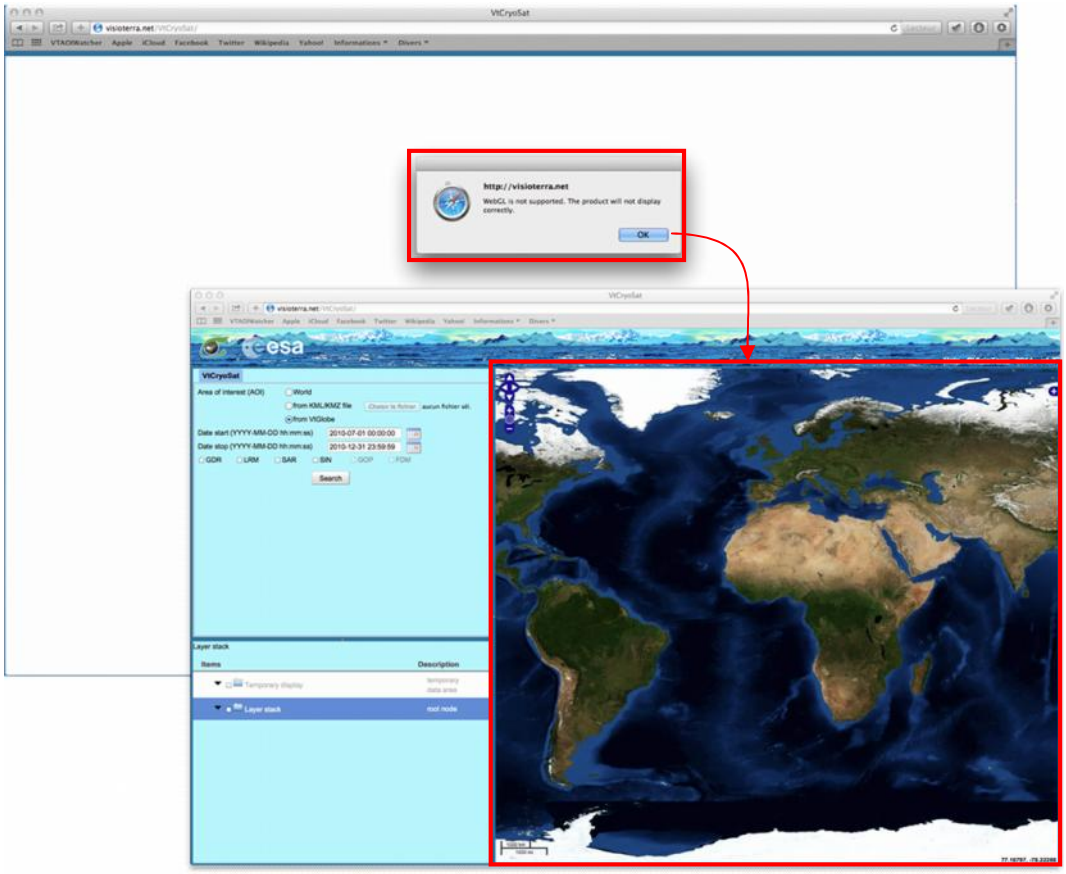


fig. 16 - VtCryoSat appearance with WebGl disabled.

In this case, the user has to change this setting in order to use the 3D view. On Safari, this requires to press the "**Enable WebGl**" button of the "**Develop**" menu. Then the user only has to reload the page.

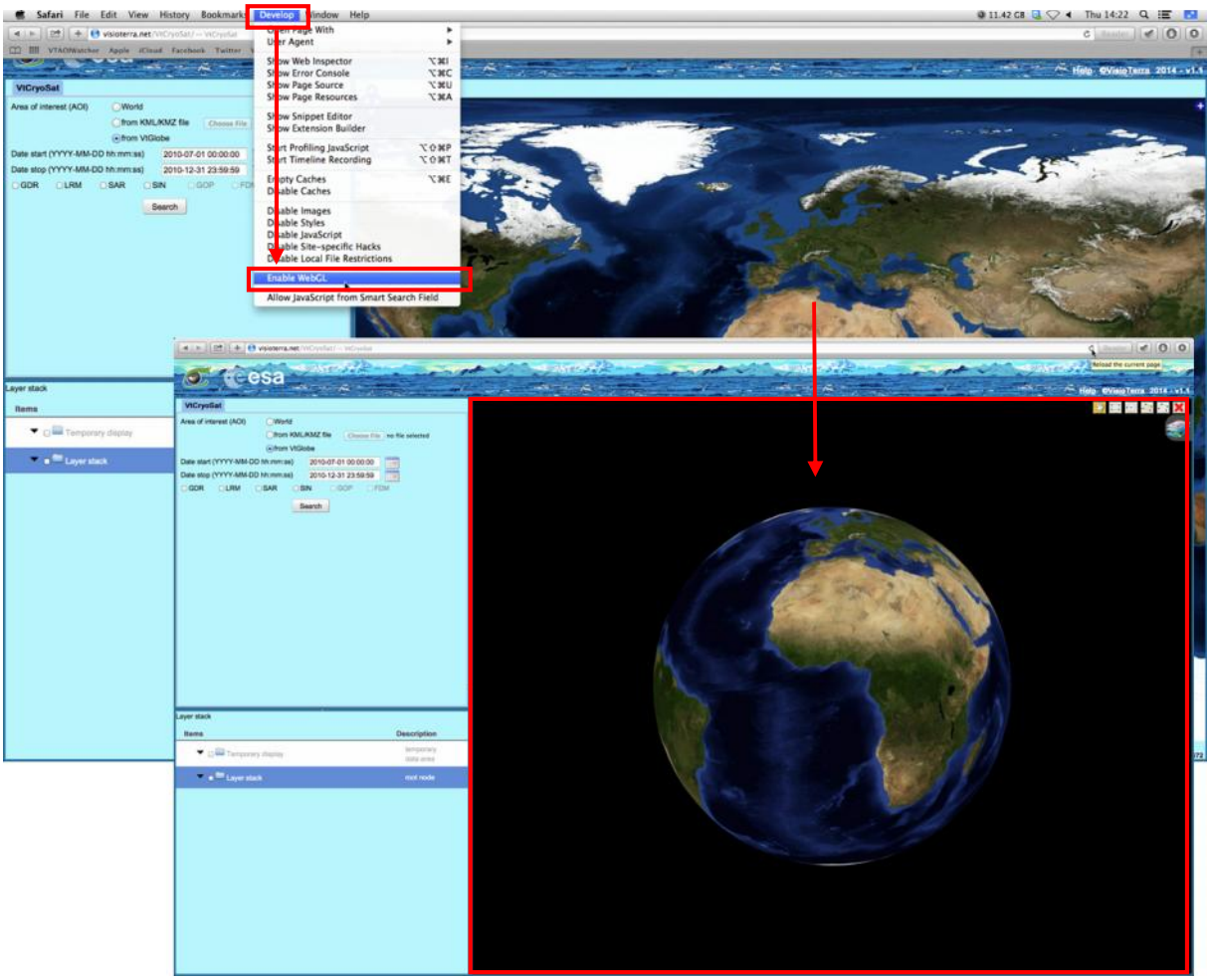


fig. 17 - Enabling WebGl.

2.4.2 Navigating across the world

Users can navigate across the globe with the **pan**, the **zoom** and the **tilt** action.

- Pan: left-click on map or globe and drag the pointer to move world. In 3D view, users can pan with arrow keys.
- Zoom: scroll mouse wheel to zoom in and out the world to pointer position. User may navigate to the native resolution. A double click zooms to pointer position.
- Tilt (only on 3D view): click on mouse wheel and drag up/down direction to change tilt.

In 3D view, the controls are similar to the controls in Google Earth ™ software.

2.4.3 Resetting the camera view

The Globe camera can be reset using

- 'r' button: to reset the tilt and the azimuth to the default values.
- 'Shift'+'r' button: to reset the tilt, the azimuth, the position and the altitude to the default values.

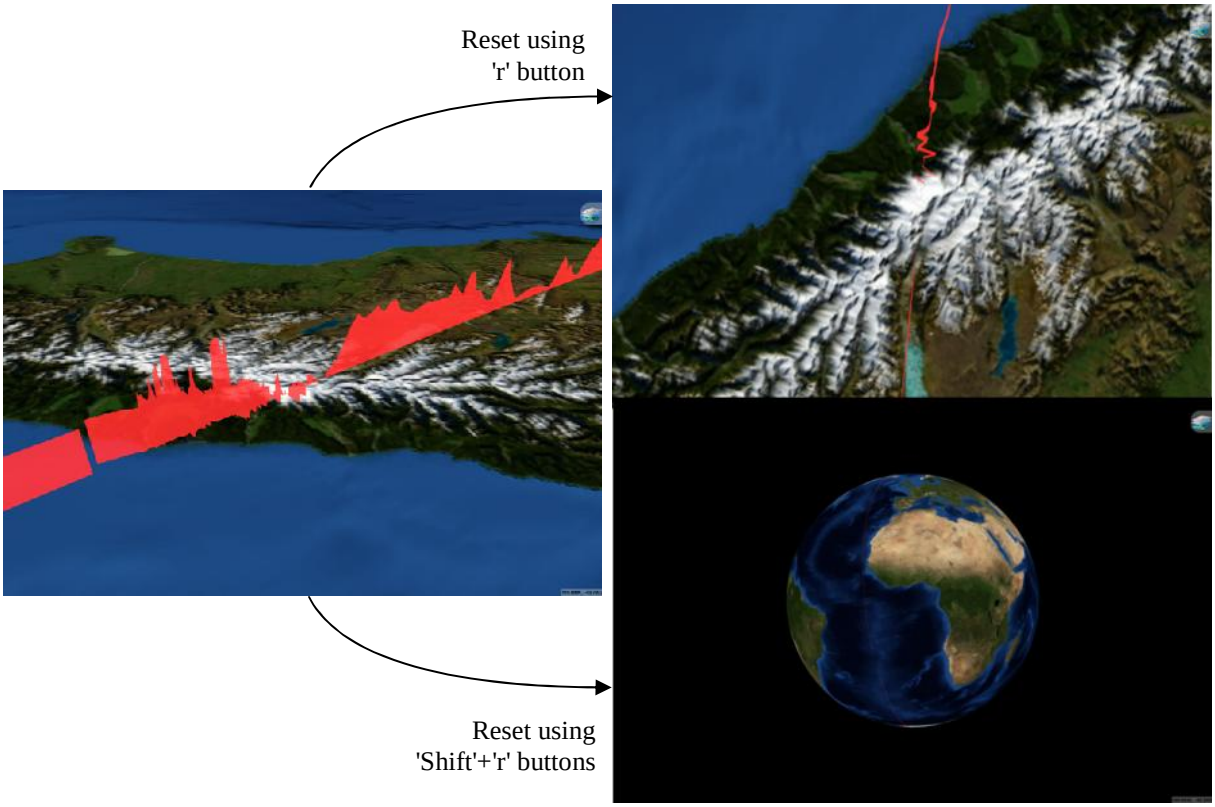


fig. 18 - Effect of resetting controls on the camera.

2.4.4 Setting background layer

The menu located at the upper-right corner of the display panel enables to select the background layer.

fig. 19 - Background layer selection menu in 2D (left) and 3D (right) view.

Figures fig. 20, to fig. 32 here after show the available background layers.

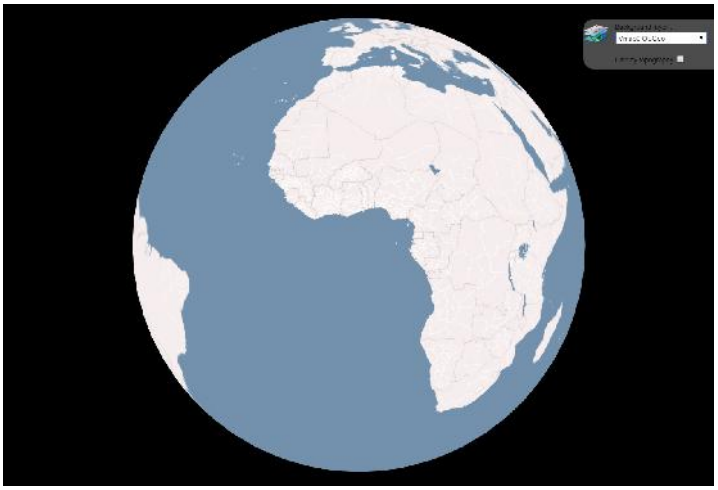


fig. 20 - OSGeo – Vmap0 background layer.

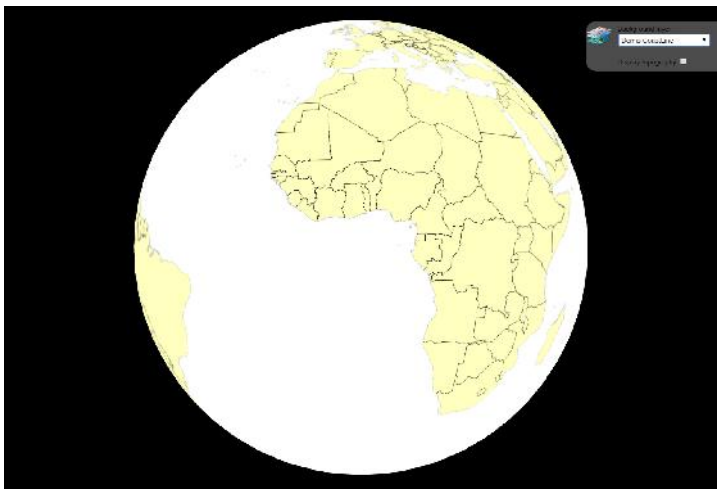


fig. 21 - Demis.nl – coastlines background layer.

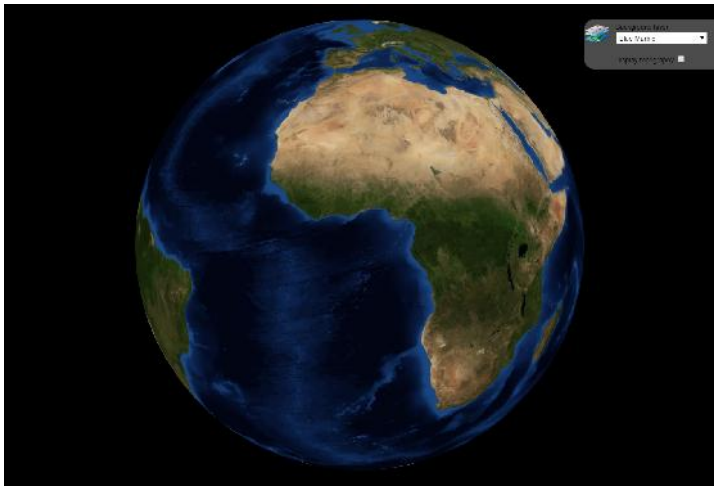


fig. 22 - NASA – Blue Marble background layer.

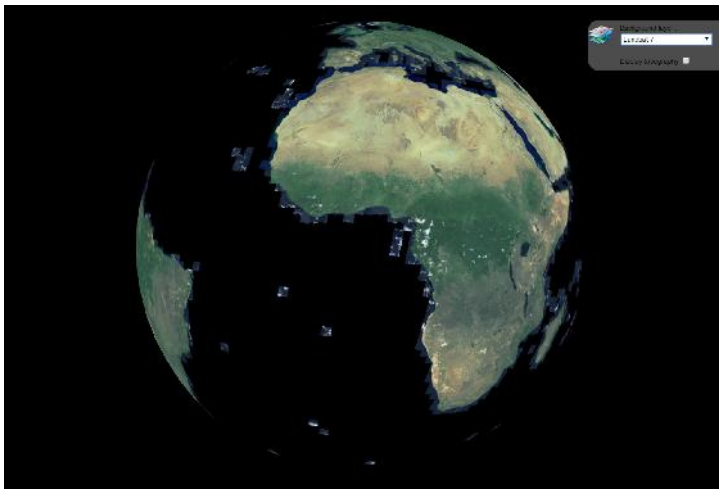


fig. 23 - NASA – Landsat-7 background layer.

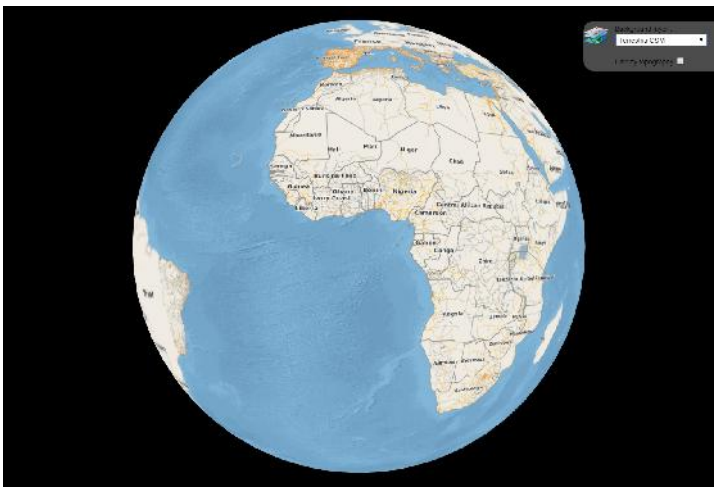


fig. 24 - Terrestris Open Street Map background layer.

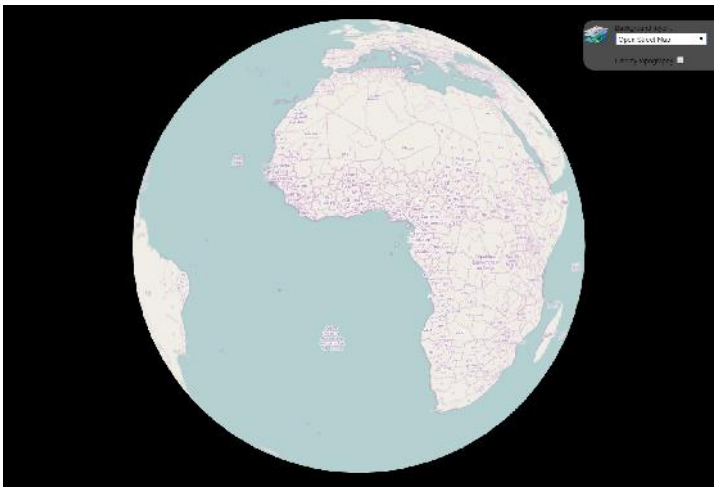


fig. 25 - Open Street Map background layer.

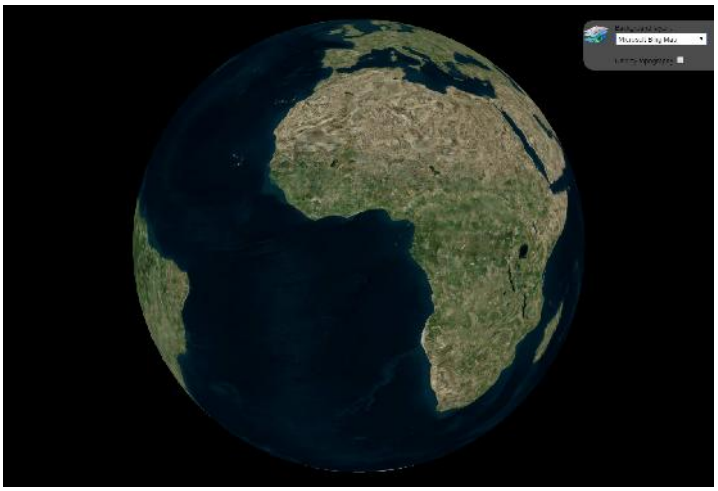


fig. 26 - Microsoft Bing Map background layer.

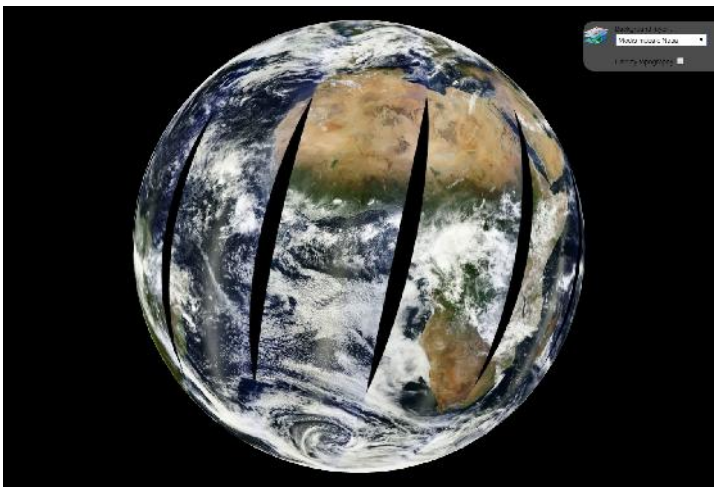


fig. 27 - NASA – MODIS mosaic background layer.

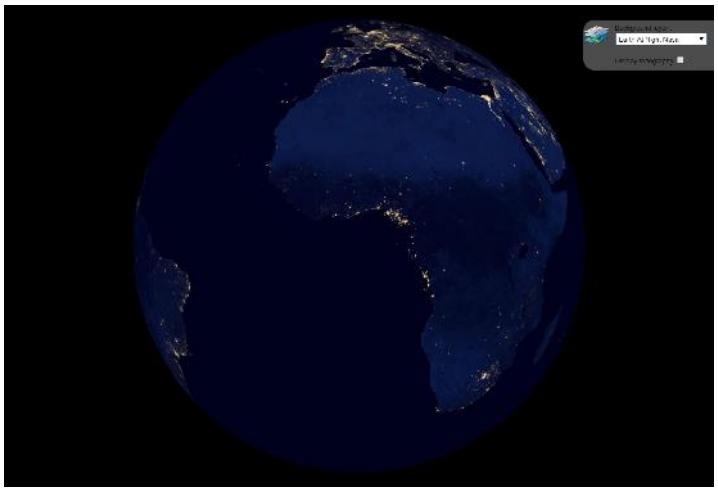


fig. 28 - NASA – Earth at night background layer.

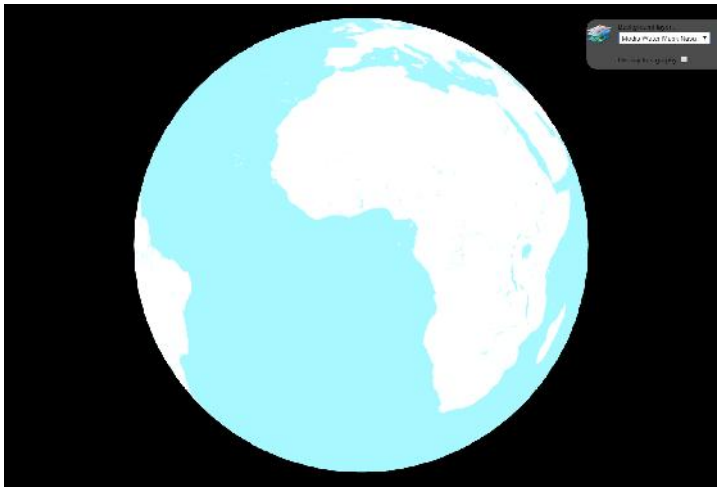


fig. 29 - NASA – MODIS watermask background layer.

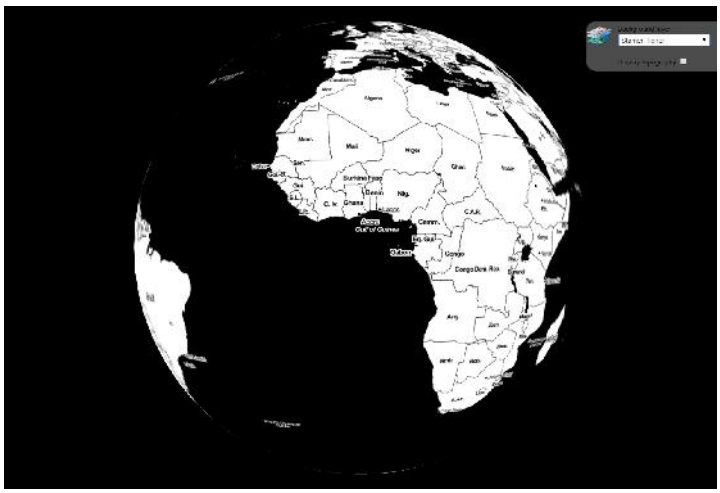


fig. 30 - Stamen toner background layer.

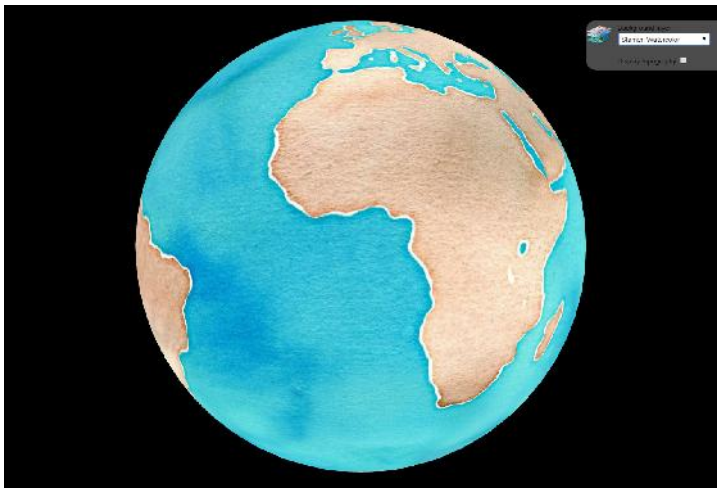


fig. 31 - Stamen water colour background layer.

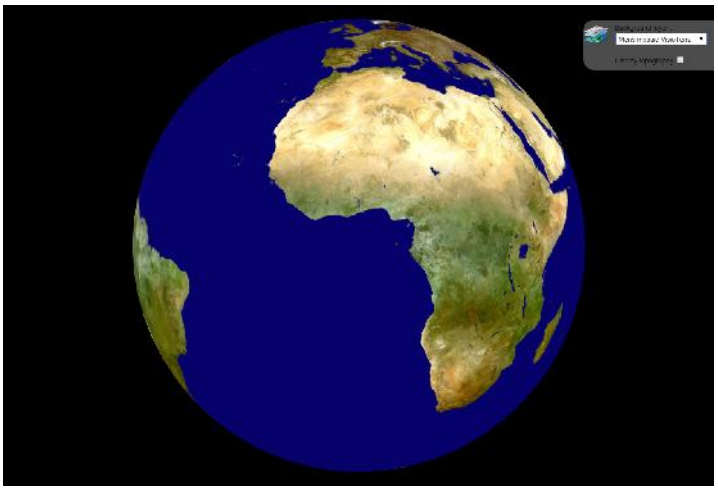


fig. 32 - VisioTerra - MERIS mosaic background layer.

It is also possible not to display a globe, using the "None" background layer.

3 VTCRYOSAT FUNCTIONNALITIES

3.1 Data search

In order to retrieve data, criteria have to be entered in VtCryosat. Options have to be selected before pressing the "**Search**" button.

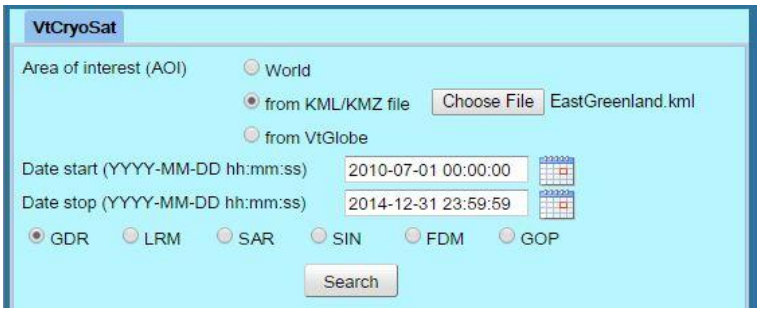


fig. 33 - The VtCryoSat search interface.

3.1.1 Geographic criteria, choice of an Area of Interest

Setting an area of interest (AOI) is the first step when using VtCryosat. If no AOI is specified, VtCryosat will search for data of the entire Earth.

With the radio button provided for this purpose, an AOI can be defined in three different ways:

- by checking the "World" option,
- by importing a polygon contained in a KML file input,
- by using the VtWeb tool on the display panel.

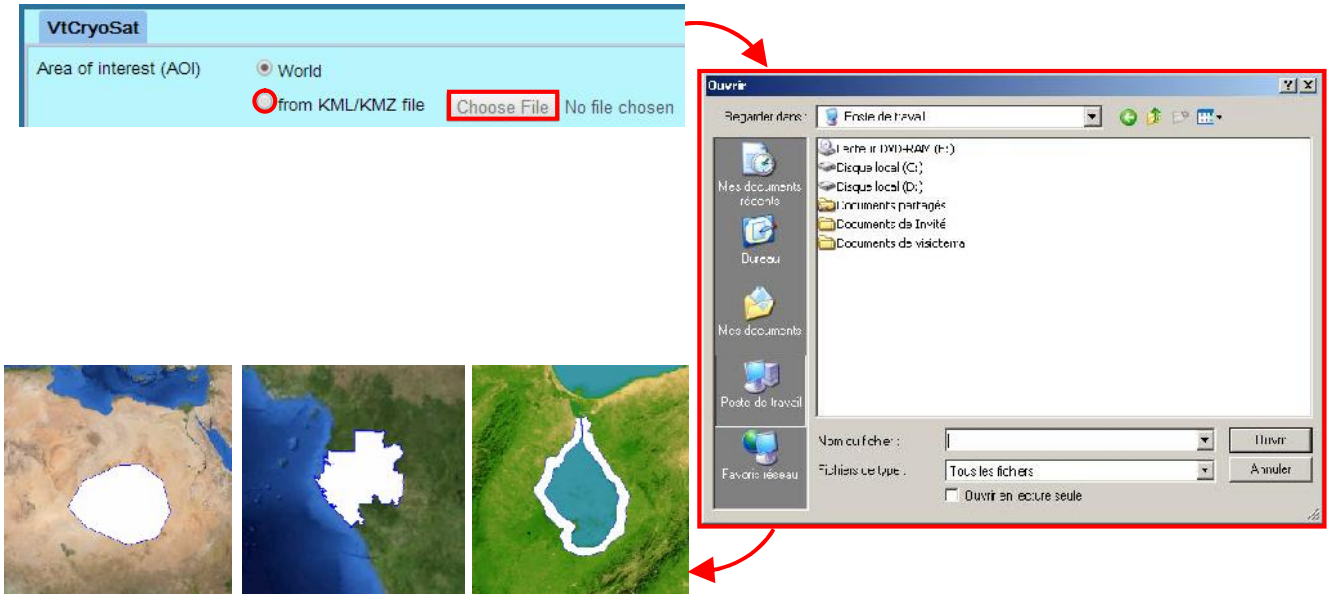
3.1.1.1 Getting the AOI from a KML file

Activating the "**Browse**" button displays an "**Open**" file chooser.

Areas of interest are closed polygons without holes stored in graphic files according to a specific format.

VtWeb only recognizes the KML format in input. KML stands for "Keyhole Markup Language", which is a format originally managed by Google Earth.

AOI may match complex patterns with an undefined number of vertices, with undefined extents on the Earth.



3.1.1.2 Getting an AOI from the display panel

The AOI may be chosen using the VtWeb tool on the display panel. It allows four types of AOI design options.

AOI designed as a bounding box

The AOI is the inside area of a box whose latitudes and longitudes extents have been defined by minimum and maximum values. Green upper left and lower right points can be dragged in order to set the extent of this box as well as the yellow central point to move the box.

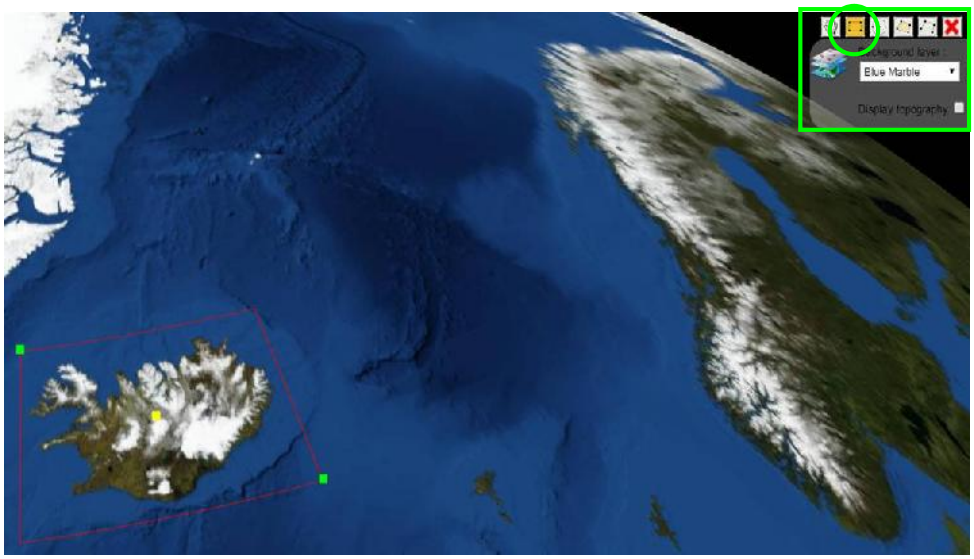


fig. 34 - Bounding box AOI on Iceland.

AOI designed as a circle

The AOI is the inside area of a circle defined by its yellow centre and a green point on the circle which determines the radius value. Both can be dragged to change the values.

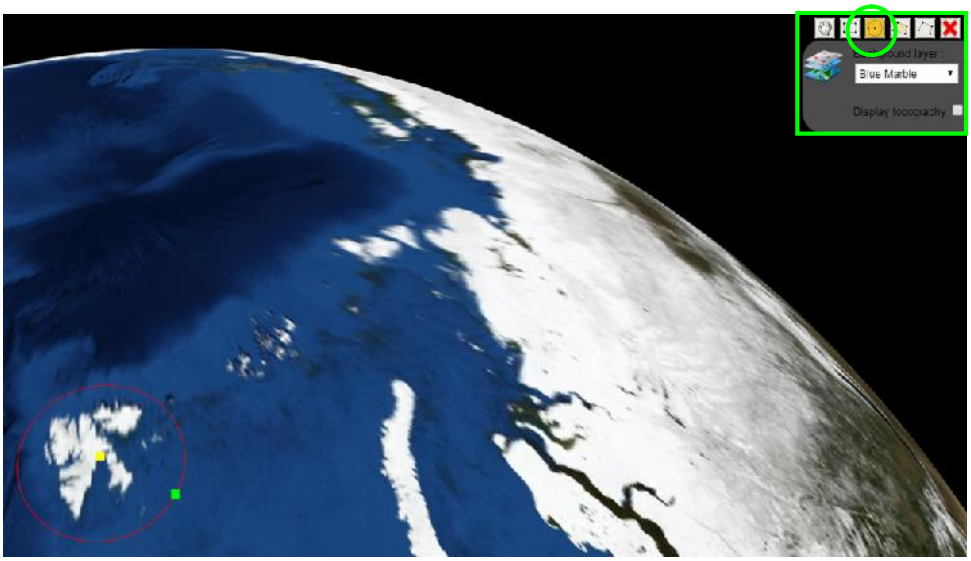


fig. 35 - Circle AOI on Svalbard.

AOI designed as a polygon

The AOI is the inside area of a polygon delimited by various points. Each delimiting green points can be dragged in order to modify the polygon, as well as the yellow centre point to move the whole polygon.

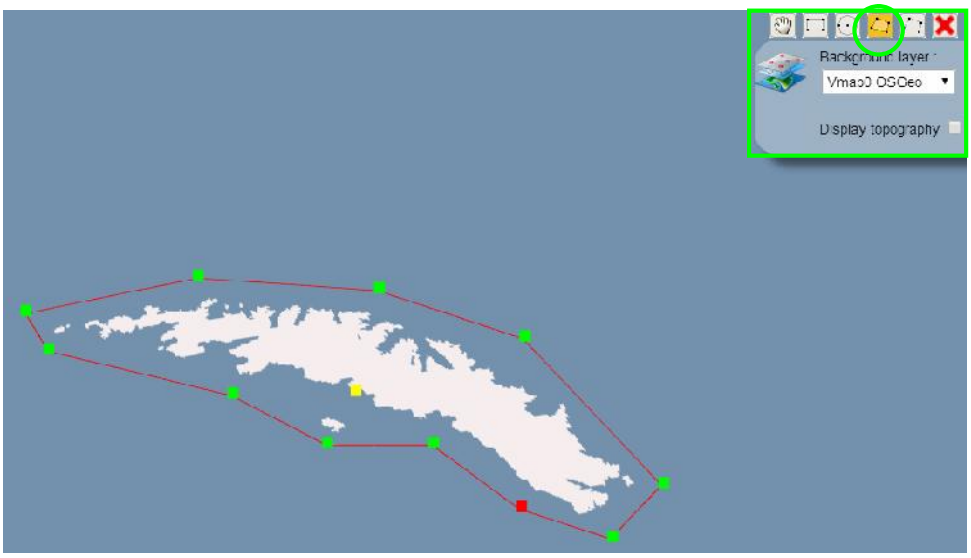


fig. 36 - Polygon AOI on South Georgia.

AOI designed as a corridor

The AOI is the inside area of a corridor defined by a central polyline and a point at the edge to delimit the buffer width around this polyline. The green points of the polyline or the green points at the edge can be dragged to modify the orientation and the width of the corridor.

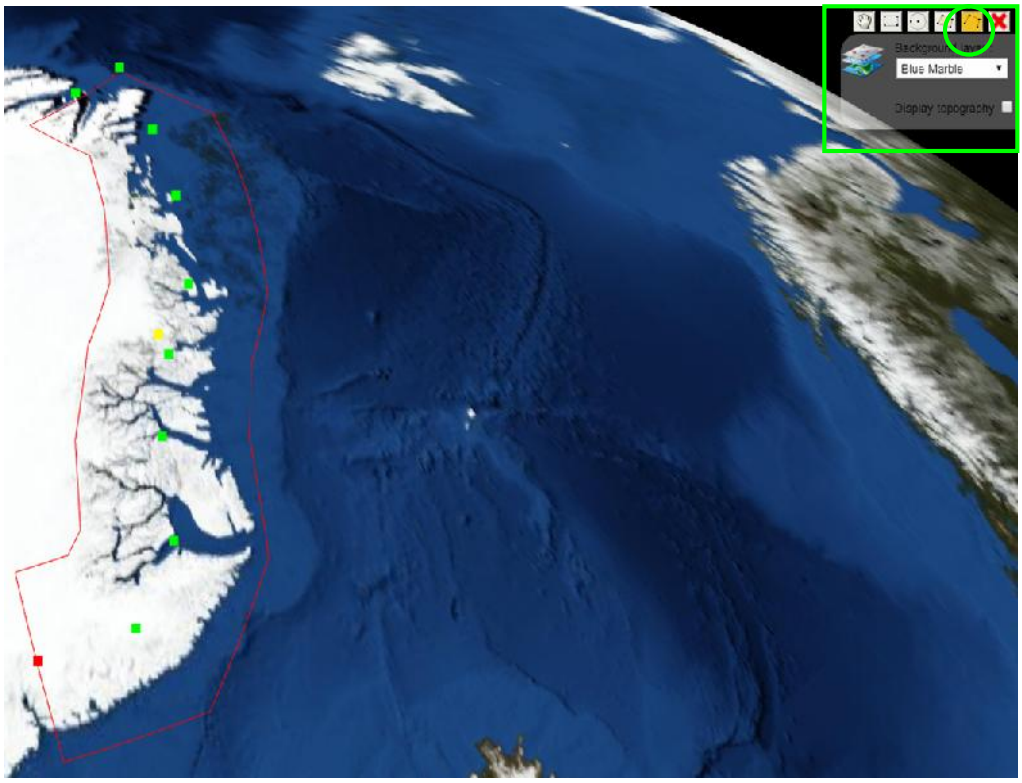


fig. 37 - Corridor AOI on Greenland's East coast.

3.1.2 Temporal criteria, choice of a time period

The temporal extent of the search may be limited by a starting and an ending date. Both can be entered manually using the YYYY-MM-DD date format or by using the calendar tool on the right that opens with a left click.

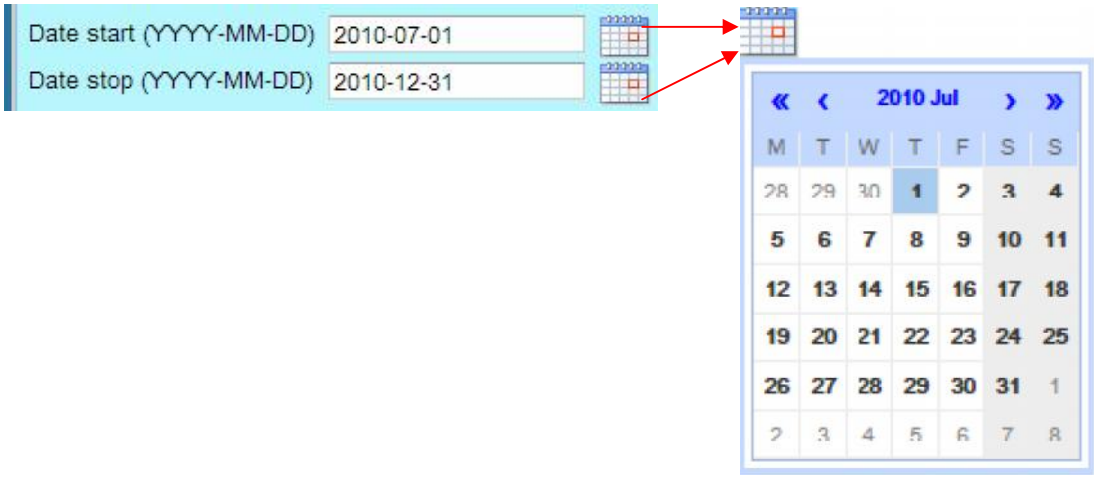


fig. 38 - Date choice tools.

3.1.3 Choice of allowed CryoSat datasets

Checkboxes list the available modes. Users can select one datasets by checking the corresponding boxes.

fig. 39 - Dataset choice tool.

3.2 List of CryoSat products

Once the search button is pressed, CryoSat products that match the criteria are listed as shown below.

fig. 40 - List of matching CryoSat products.

This list can be arranged by mode or by product names. Each product keeps the name defined by ESA, using the pattern:
MM_CCCC_TTTTTTTTTT_yyyymmddThhmmss_YYYYMMDDTHHMMSS_bvvv.ttt

where:

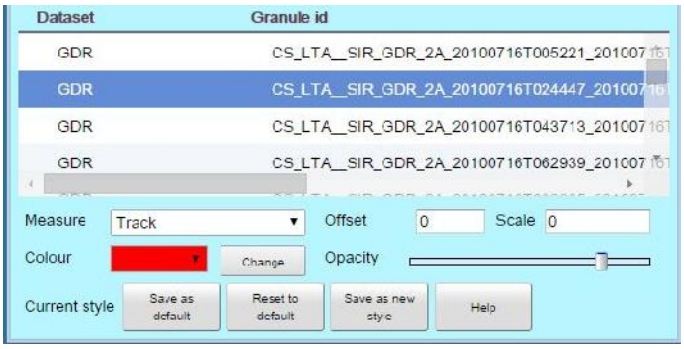
- MM — is the mission identifier, which is CS for CryoSat,
- CCCC — is the file class which can be OFFL (Off-Line Systematic Processing), NRT_ (Near Real Time), RPRO (ReProcessing), TEST (Testing) or LTA_ (Long Term Archive),
- TTTTTTTTTT — is the CryoSat SIRAL dataset used for the acquisition,
- yyyymmddThhmmss — is the start time window as extracted from Job Order,
- YYYYMMDDTHHMMSS — is the stop time window as extracted from Job Order,
- b — is the baseline identifier as read-in from the PCONF,
- vvv — is the version number of the file,
- ttt — is the extension: HDR for Header and DBL for binary data

3.3 Managing search results (CryoSat products)

3.3.1 Display product

A CryoSat product can be displayed in the default style. It is the style in which it is displayed in the temporary layer stack.

The default style can be changed by using the tools below the products list.



As shown in section 2.3.3.2, another style different from the default one can be applied. An existing style that has been copied or a new style that as been previously created may also be edited.

It is possible to do so thanks to the following modal window which is accessible from the contextual menu by choosing Style / Create new style, Style / Copy or Style / Edit on a non predefined Style.

By using the current parameters, a new style can also be crated with the "**Save as new style**" button. A pre-filled window will then appear.

Both interfaces have the same widgets to select the measure, the scale, the colour, the line thickness and the opacity of the vector.

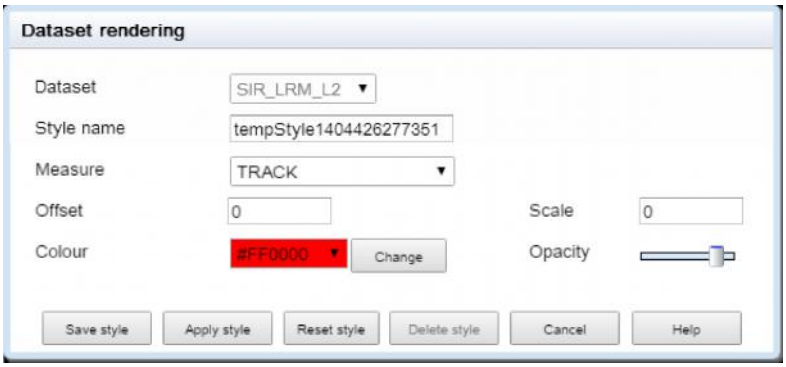


fig. 41 - The new style window.

3.3.1.1 Choosing the measure to display

When opening this window and by using the pulldown menu called "**Measure**", users can choose the measures of the level 2 that should be displayed.

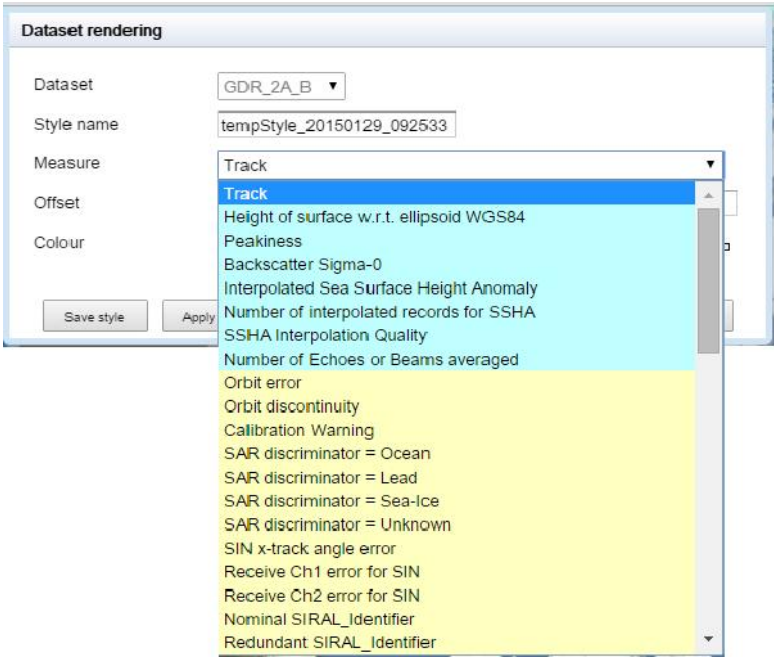


fig. 42 - Selection of the measure to display.

3.3.1.2 Choosing the scale factor of the display

The scale factor of the measure as shown on the globe can also be changed by setting the scale field to a positive number value. Since the measures may have a value in the centimetre scale, a large value might be needed in order to get an observable output.

3.3.1.3 Choosing the colour of the display

Colours differentiate the various measurements of a same CryoSat product. By pressing the "**Change**" button, a widget which specifies a colour from the Hue Saturation Value (HSV) or Red Green Blue (RGB) spaces is opened.

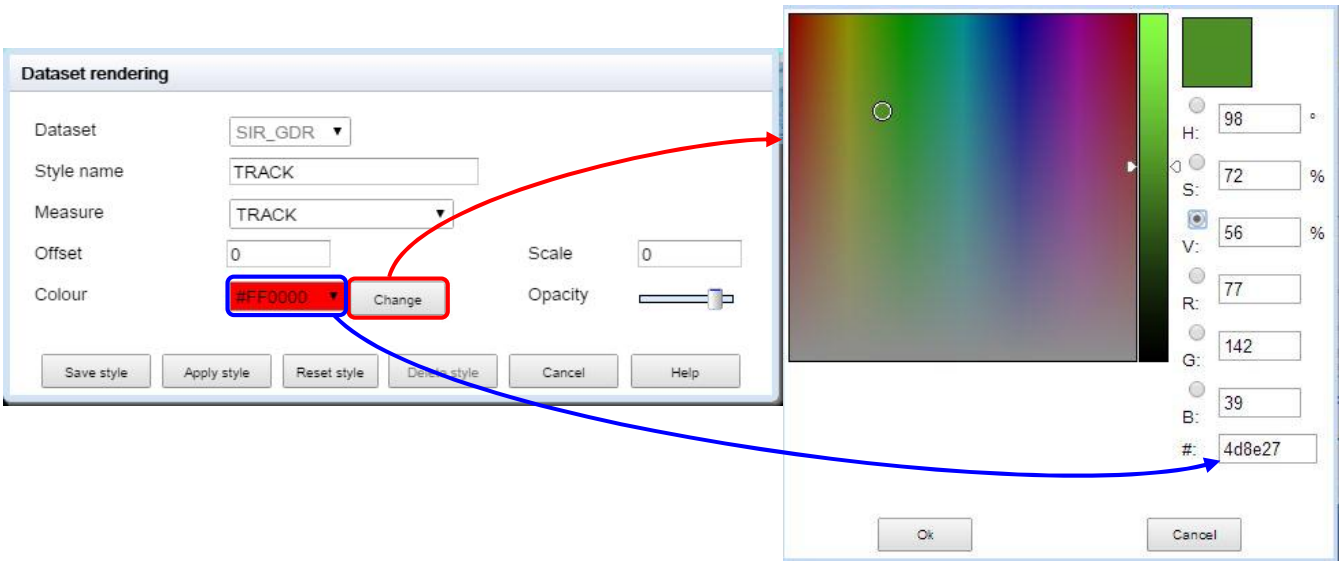


fig. 43 - The colour picking window.

The last colours specified are accessible from a pull-down menu to keep several styles accessible in an easier way.

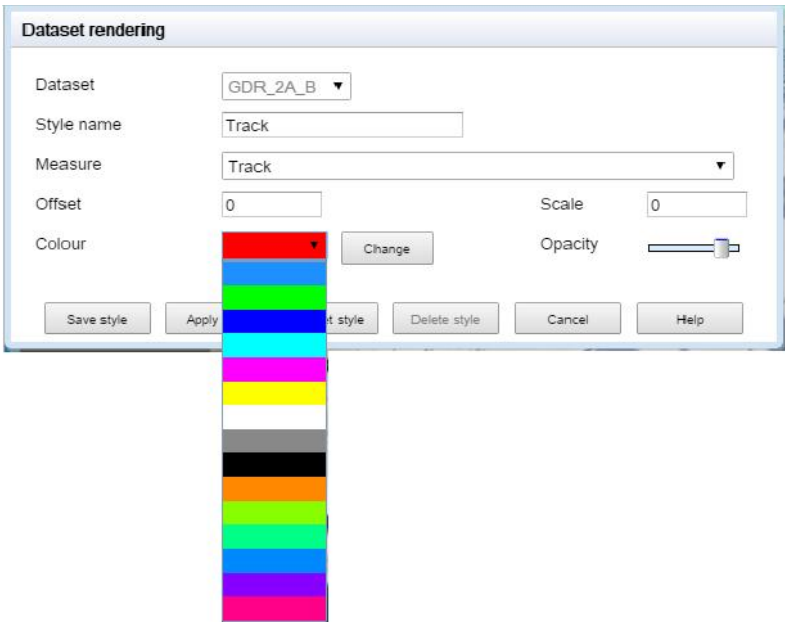


fig. 44 - Use of the last colours menu.

3.3.1.4 Choosing the opacity of the display

The degree of opacity of the vectors can be changed by using the **Opacity** slide bar the same way it is described in **Erreur ! Source du renvoi introuvable.**.

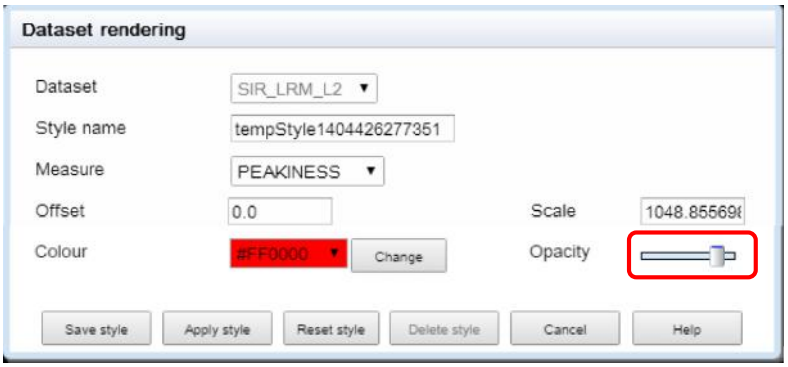


fig. 45 - Setting the style opacity.

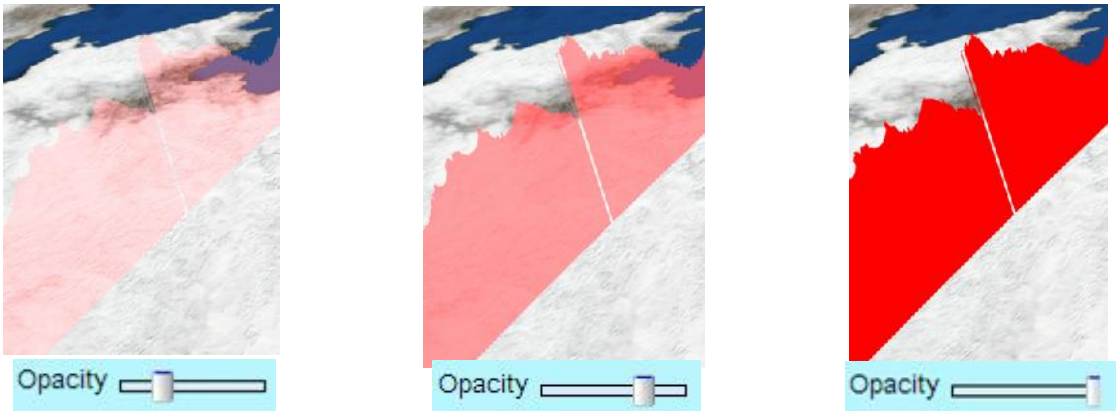


fig. 46 - Layer stack – Opacity set around 30% (left) 70% (centre) and 100% (right).

3.3.1.5 Applying the style

The style may be tested and displayed on the selected CryoSat product by using the "**Apply style**" button.

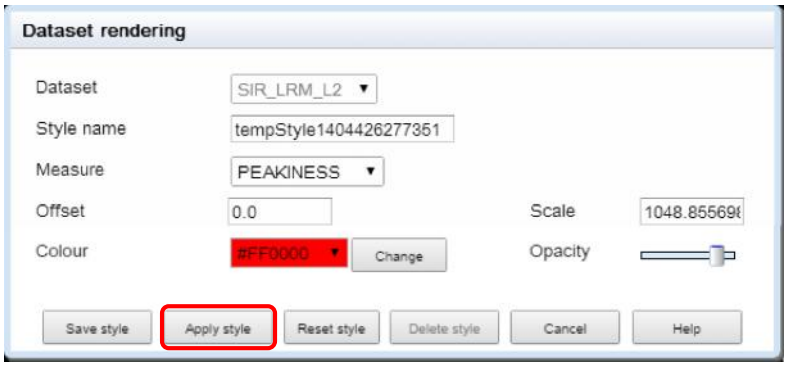


fig. 47 - Applying the style.

3.3.1.6 Saving the style

The current style may be saved under the given Style name by pressing the "**Save style**" button.

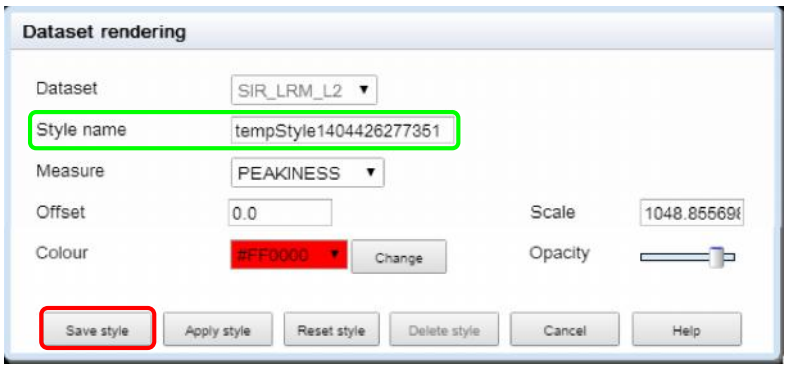


fig. 48 - Applying the style.

3.3.1.7 Cancelling the style creation / edition

The current style editing may be cancelled by pressing the "**Cancel**" button.

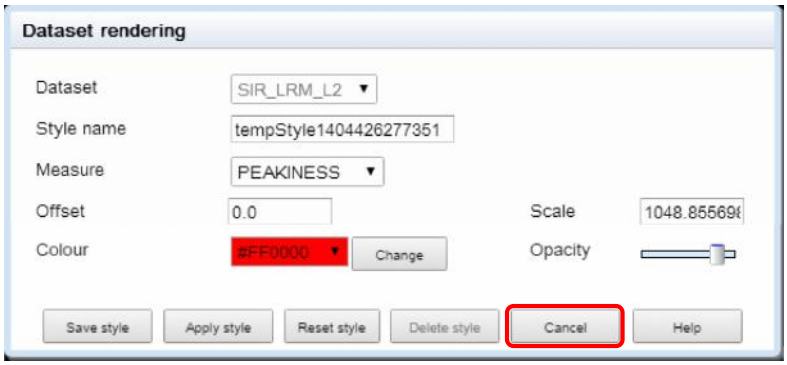


fig. 49 - Cancelling the style edition.

3.3.1.8 Default styles

For each default style, the opacity is set at 80% and the line thickness (which is not an implemented feature on Windows) set to 1 point.

For each measure, an histogram has been computed for each measurement of each product. Its cumulative histogram has been calculated so that the 0.1% and 99,9% could be found.

The values outside this interval have been considered as outliers so that the dynamic could be focused on the central 99,8% values, rather than taking into account very rare or aberrant values

3.3.2 Export product

The user can export a profile derived from the values of a granule's measure in KML or KMZ.

Pressing the "**Download**" button in the context menu then picking "**As KML**" opens a new modal window that specifies a local folder and a file name for the KML export.

This file only contains the measure and style that were used to display the profile in the layer stack. It doesn't contain the full data.

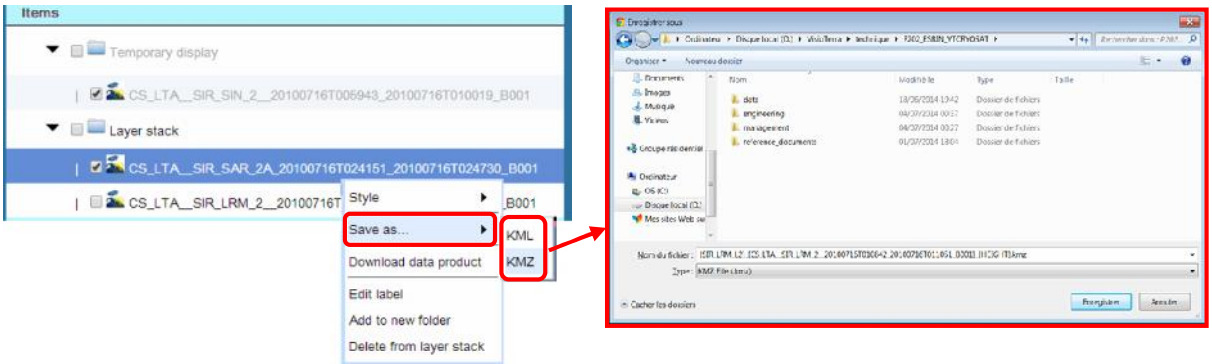


fig. 50 - Exporting a product.

3.3.3 Download data

Original CryoSat products can be obtained from the ESA CryoSat dissemination server by pressing the "**Download**" button in the context menu and by selecting the "**Product data**" option. This will open a

transient window called "**Download data**" which enables users to sign in and to select the level of CryoSat products to be downloaded (see fig. 51).

3.3.3.1 Restricted access

The user has to specify a login and password provided by ESA. For further information, please, visit the "Data Access" pages of the ESA Web site (https://earth.esa.int/web/guest/data-access).

User may let the password in clear when typing it or hide it as stars using the "**Hide**" checkbox. Once logged in, one won't be asked to do it for further downloads during the session.

3.3.3.2 Product levels

The selected input product file, whose original version is required, is extracted from a level 2 CryoSat product file available in datasets such as LRM, SAR, SIN, GDR, FDM.

The "output file" that is to be downloaded is a ZIP archive that contains a DBL product file and the associated HDR header file. The product file may be the input product file itself or another product file according to the following rules:

- If the input product file is a GDR product, user may only download the GDR granule.
- If the input product file is a FDM or a GOP product file, user may select one of the following options:
  - Level 1 - to download the level 1 granule matching exactly the level 2 product in input.
  - Level 2 - to download the input product file and the associated header file.
- Otherwise, user may select one of the following options:
  - Level 1 - to download the level 1 granule matching exactly the level 2 product in input.
  - Level 2 - to download the input product file and the associated header file.
  - GDR - to download the GDR granule that includes the input product file. Note: GDR products are level 2 products. Their size has the scale order of a whole revolution.

3.3.3.3 Download path

Pressing "**Cancel**" will abort the download operation. Otherwise the browser-specific "**Download as**" window will be called to specify the file path and name.

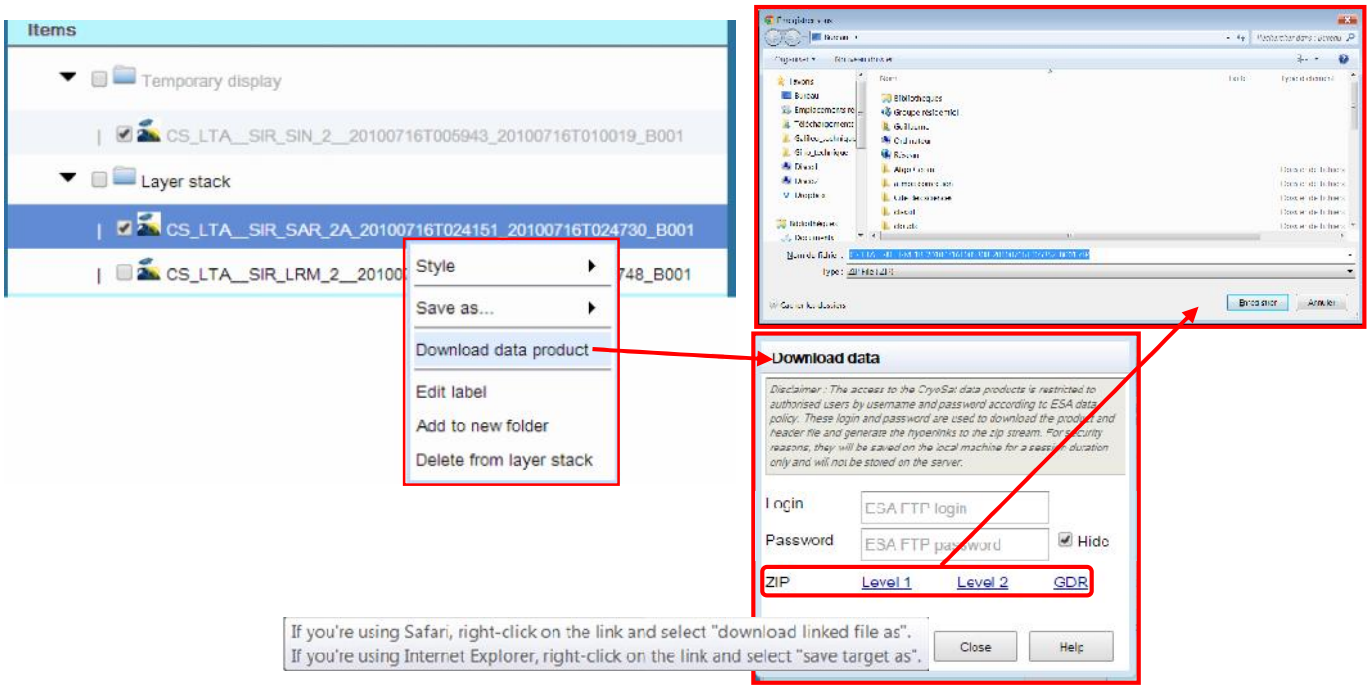


fig. 51 - The download product data window.

If the login / password combination is invalid, another modal window will be displayed to inform the user.

ANNEX A OTHER FUNCTIONALITIES OF THE VTWEB PLATFORM

A.1 Getting associated meteorological data

It is possible to import a layer in relation with an EO product by right clicking on it to have the context menu appear and then by selecting the "**Get associated layer**" option. For example, one may find useful for the interpretation to display meteorological data contemporary of a selected CryoSat track.

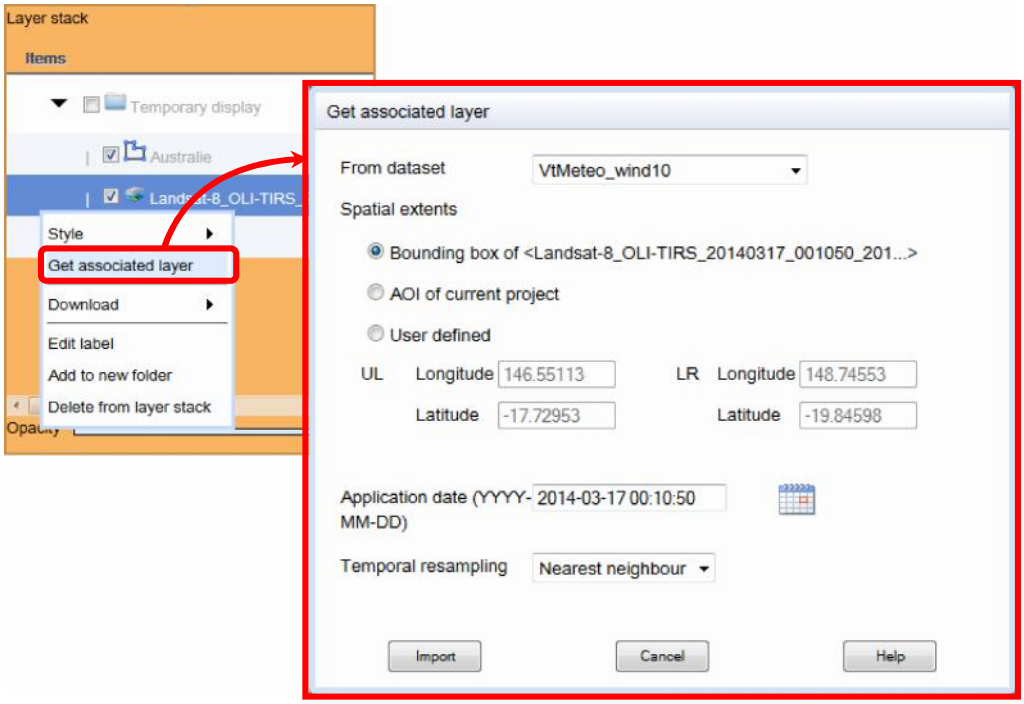
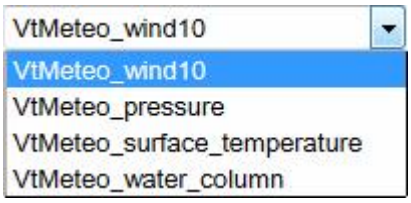
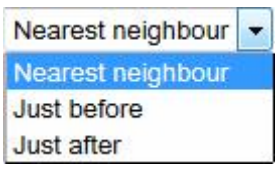


fig. 52 - Layer Stack – Getting associated data.

Different parameters have to be set before importing an associated layer.



- **Dataset**: Select a dataset from a list. The attached list gives the four meteorological layers available in the VtMeteo collection.
- **Bounding box**: Select a bounding box for the associated layer between -bounding box of the origin layer (in our example a Landsat-8 OLI-TIRS layer), -the bounding box of the current project, or –a bounding box defined by user. Default value is the original layer bounding box.



- **Date-Time**: Select application date of the new layer. Default value is median of the origin layer date start and date stop.
- **Temporal resampling**: Select a temporal interpolation method from the attached list. Default value is "nearest neighbour" interpolation.

Once parameters have been set, users can import the associated layer by pressing the "**Import**" button or quit without import by pressing the "**Cancel**" button.

A.2 On-the-fly processing and dataset rendering

A.2.1 Multiscale display - The VtQuadtree organisation

VtQuadtree organisation is a **multi-scale tile-pyramid** which enables to display data with an adapted resolution on the screen. The pyramid contains different levels: level 0 corresponds to the full resolution of the data.

Figure fig. 53 shows different levels of a VtQuadtree. For pedagogic purposes, the borders and the coordinates (level, x and y value) of each tile appear in green in this example.

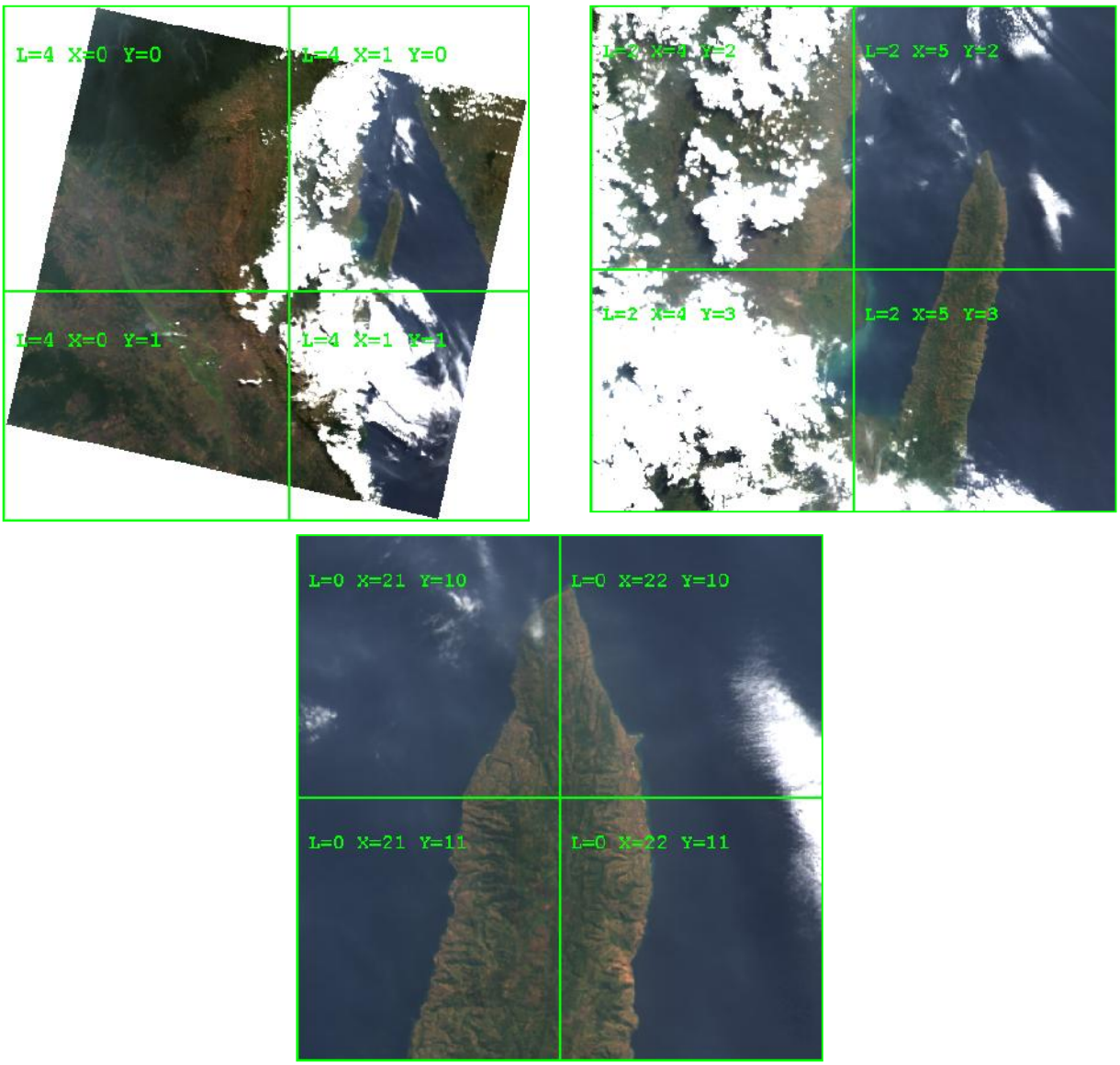


fig. 53 - VtQuadtree example – Level 4 (top left), Level 2 (top right) and Level 0 (bottom).

A.2.2 On-the-fly processing pipe

The "**on-the-fly**" process is divided in three parts. When an EO product several bands, the first step made is "**RGB mapping**". The second step, for all type of data, is "**Radiometry processing by Histogram transformation**" and the third step is "**Radiometry processing by filtering**".

There is an implicit final step that is the data remapping.

A.2.2.1 Step 1 – RGB mapping

The RGB mapping, also called "Colours Composite (CC)" allows the selection of three bands and assign them to the "**Red**", "**Green**" and "**Blue**" channels.

The following figures show different processes of "RGB mapping".

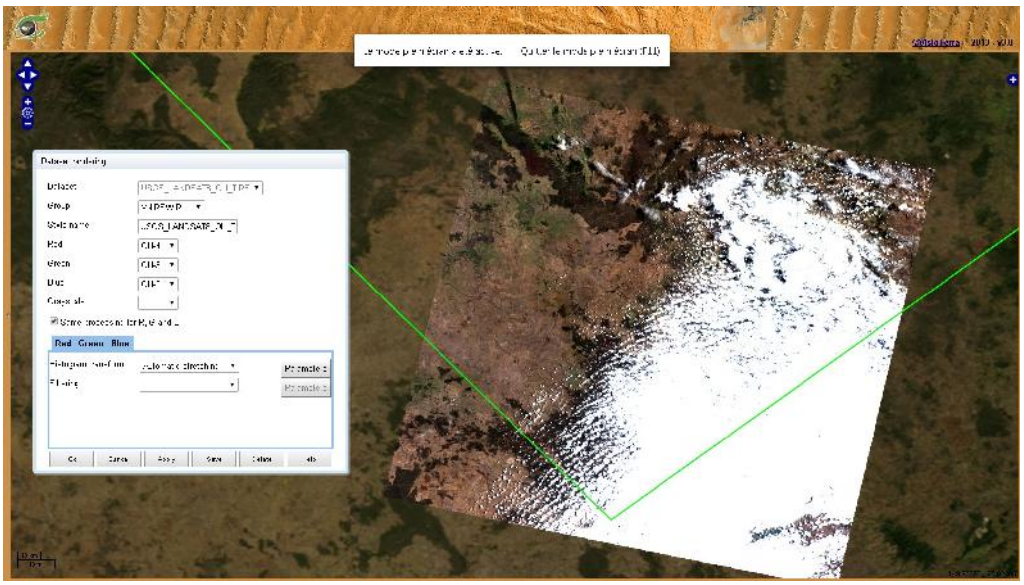


fig. 54 - Landsat-8 CC 4 3 2.

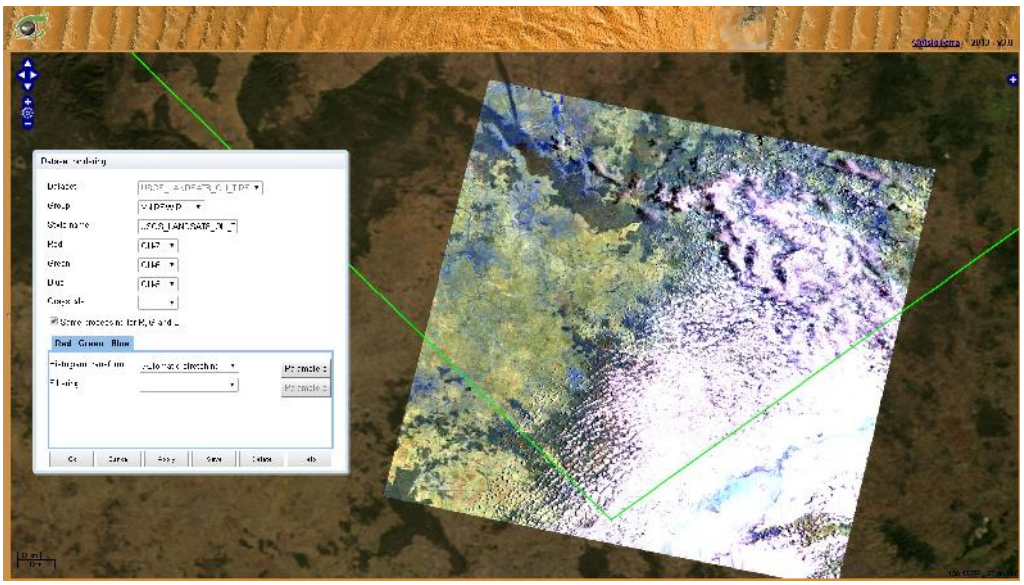


fig. 55 - Landsat-8 CC 7 6 5.

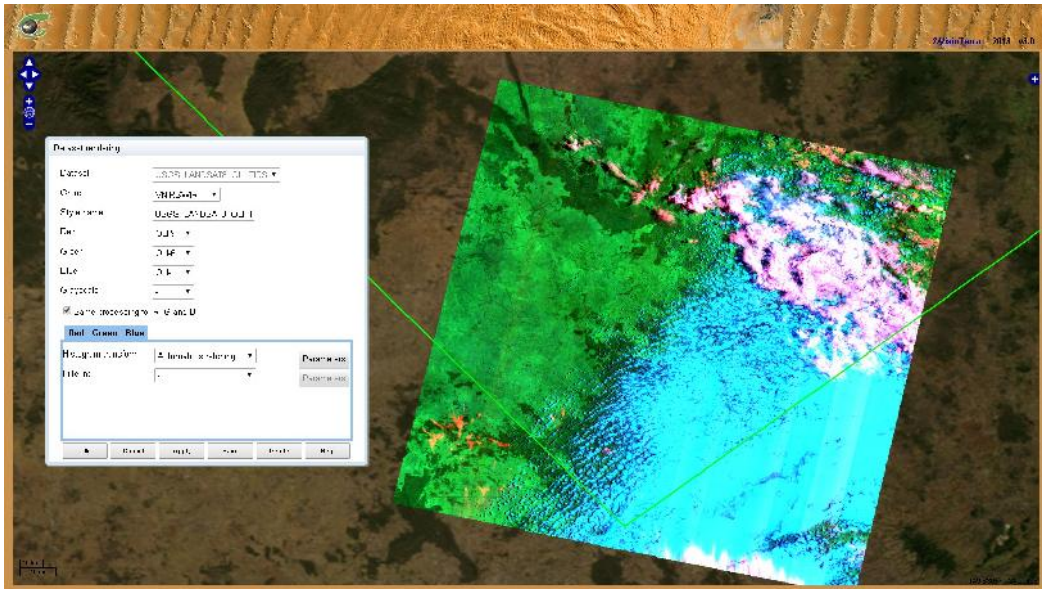


fig. 56 - Landsat-8 CC 9 6 1.

A.2.2.2 Step 2 – Radiometry processing by "Histogram transform"

This process applies a global transformation on radiometric values by "**histogram transform**". For example, an automatic stretching can be applied as can be seen in the following figures.

Figures fig. 57, fig. 58, and fig. 59 show different transformations.

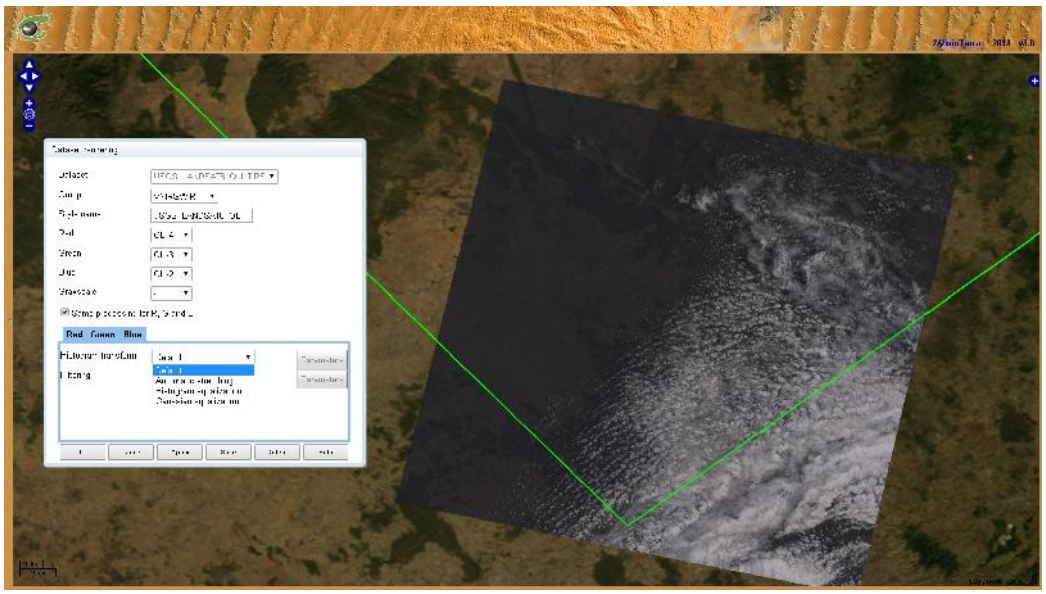


fig. 57 - Default histogram transform.

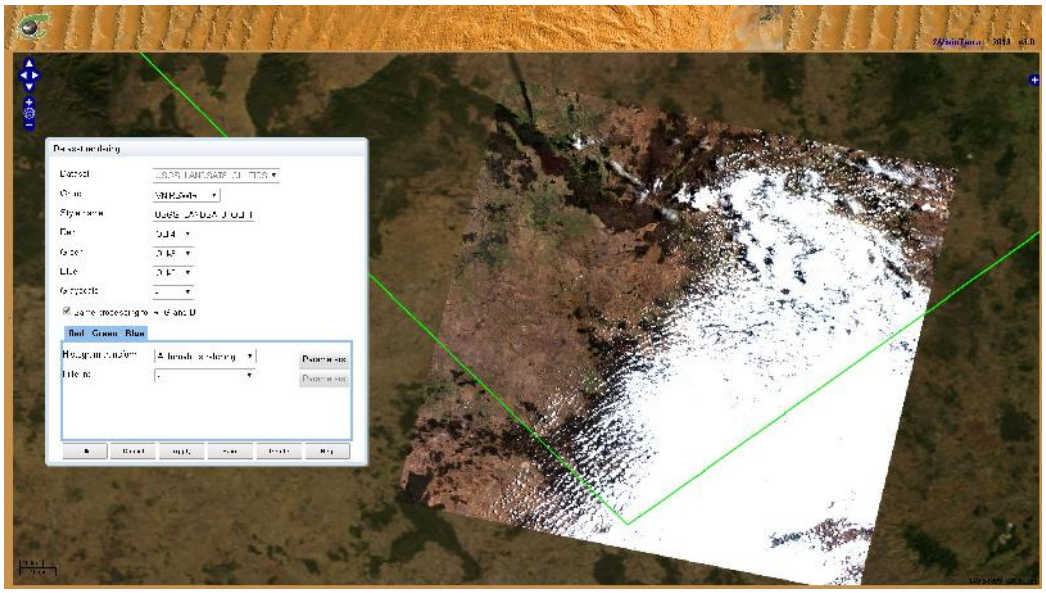


fig. 58 - Automatic stretching 2%.

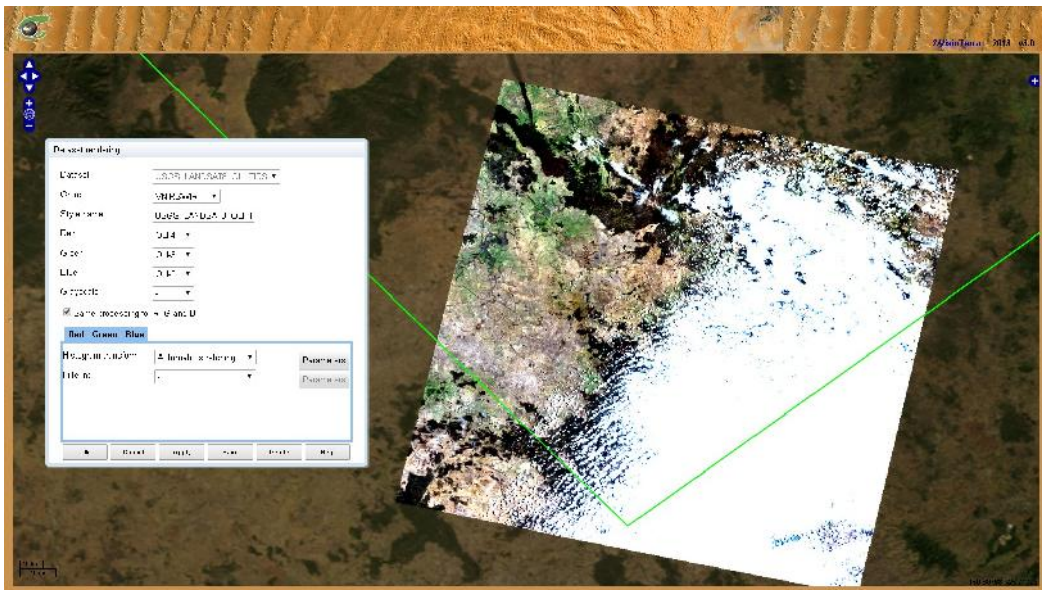


fig. 59 - Automatic stretching 14%.

A.2.2.3 Step 3 – Radiometry processing by "Filtering"

This process applies a radiometric transformation by filtering relative to a local statistics window.

Figures fig. 60 and fig. 61 show a data before and after filtering.

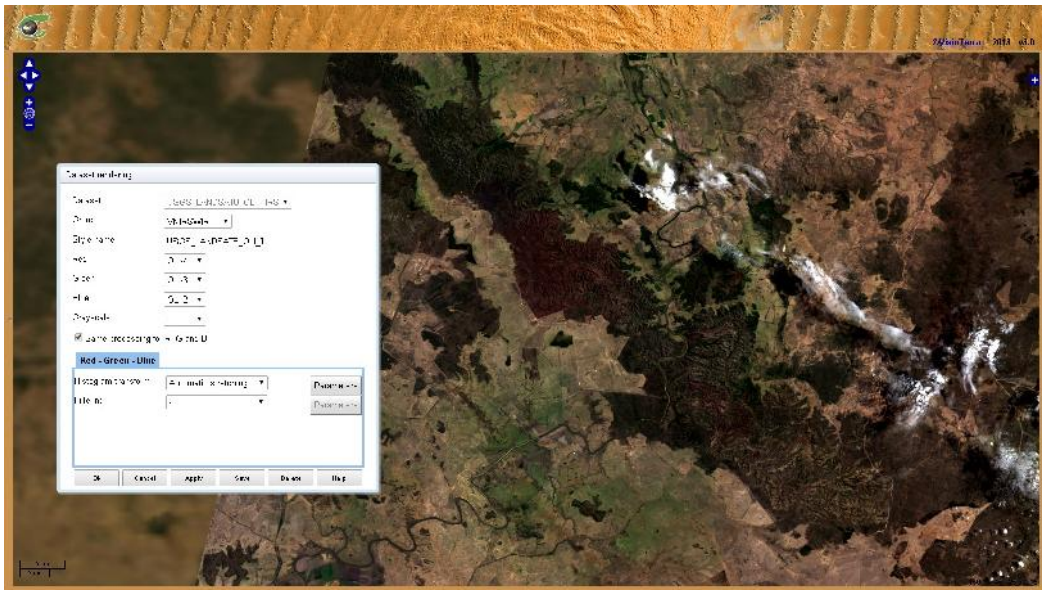


fig. 60 - No filtering.

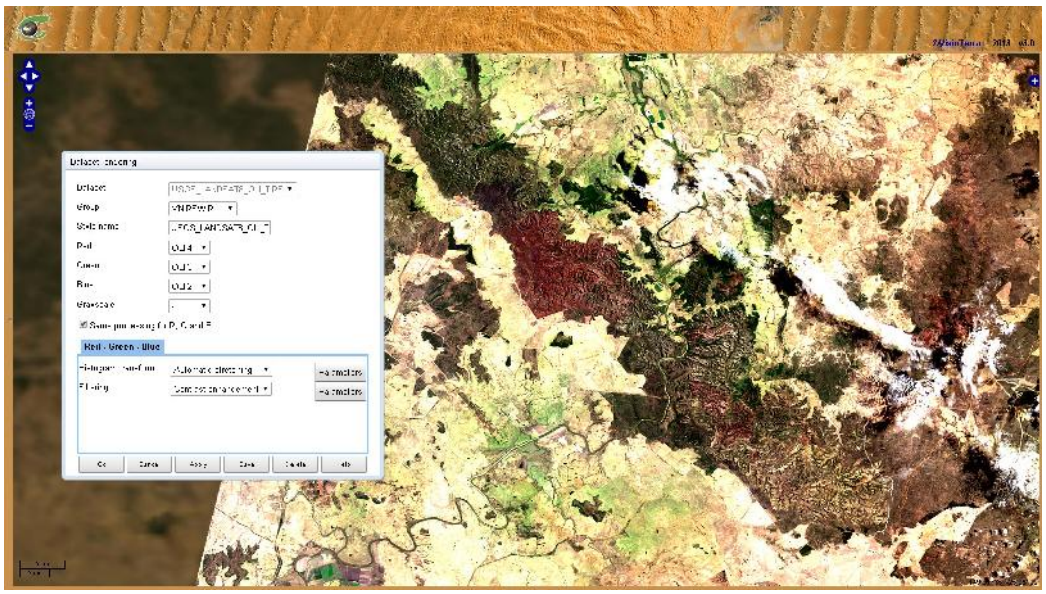
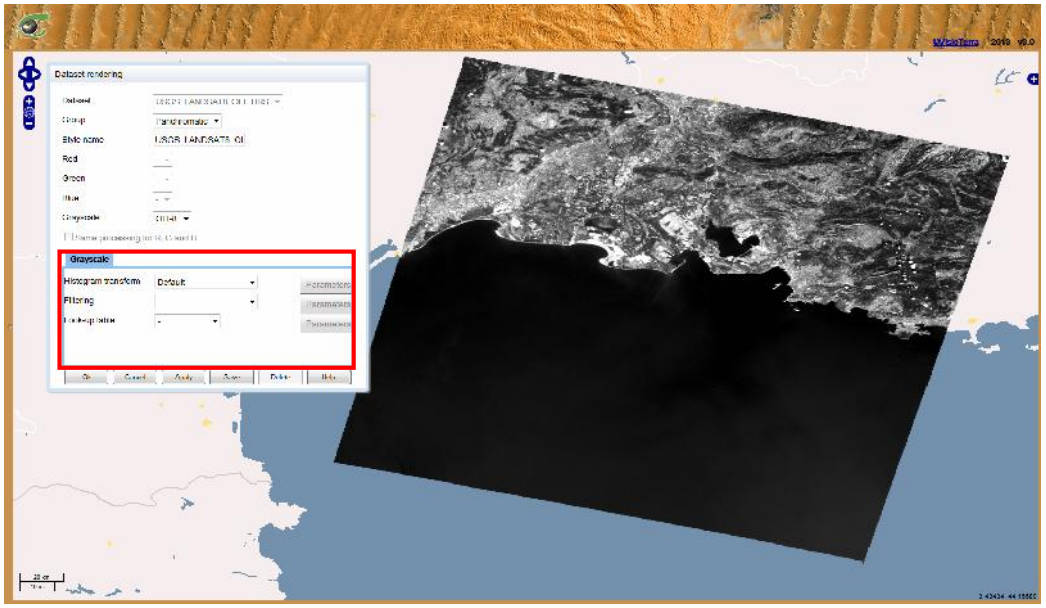


fig. 61 - Sharpening.

A.2.3 Dataset rendering

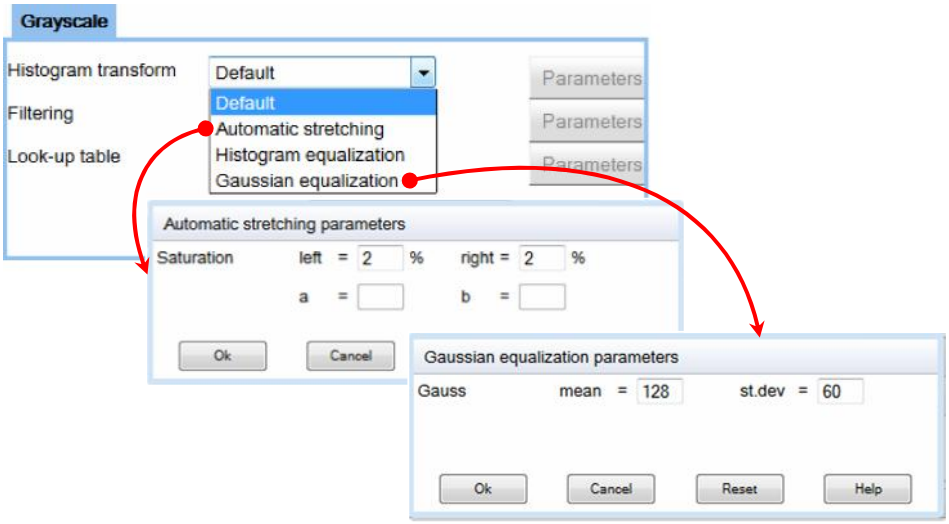
There are two different ways of modifying dataset rendering parameters. One can either select "**Tools > Options**", tab "**Dataset Rendering**" or right-click on an EOP, select "style and create" or "edit a style".

A.2.3.1 Standard greyscale rendering

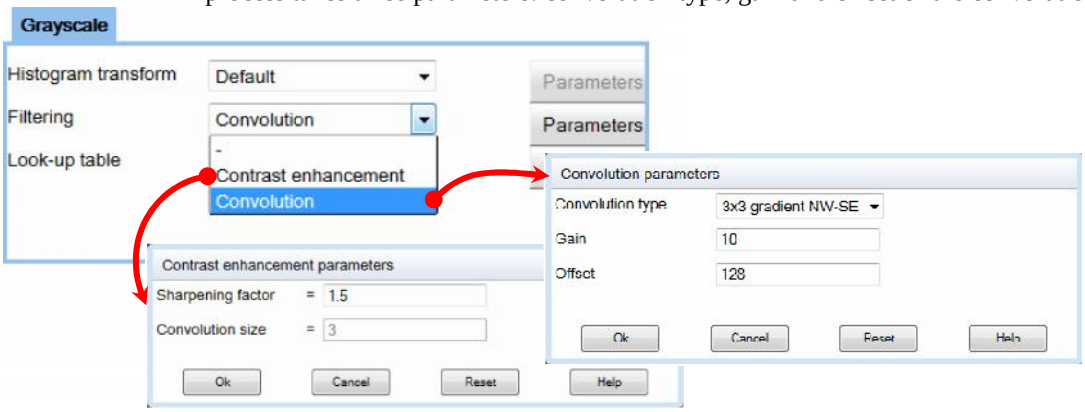


A greyscale rendering has the following processes.

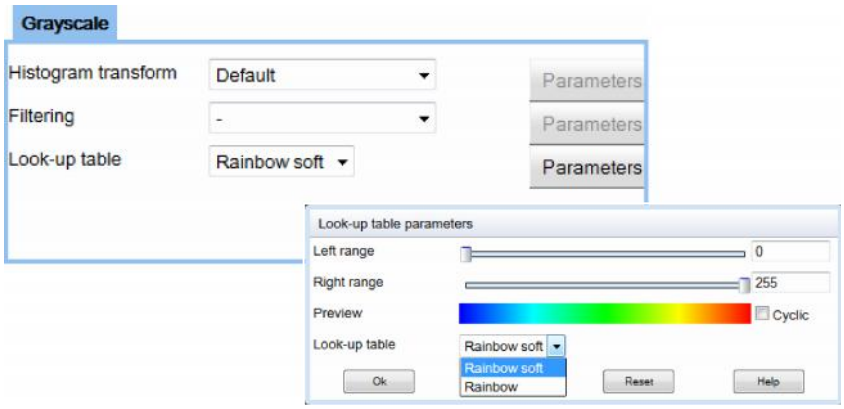
- **Histogram transform**:
  - Default - Converts data from 16 bits to 8 bits.
  - Automatic stretching - Automatic stretching is effectuated with **independent** left and right saturation percent.
  - Histogram equalisation - Automatic stretching is effectuated with a **flat histogram** model.
  - Gaussian equalisation - Automatic stretching is effectuated with a **gaussian histogram** model. This model is defined with two parameters, mean and standard deviation.



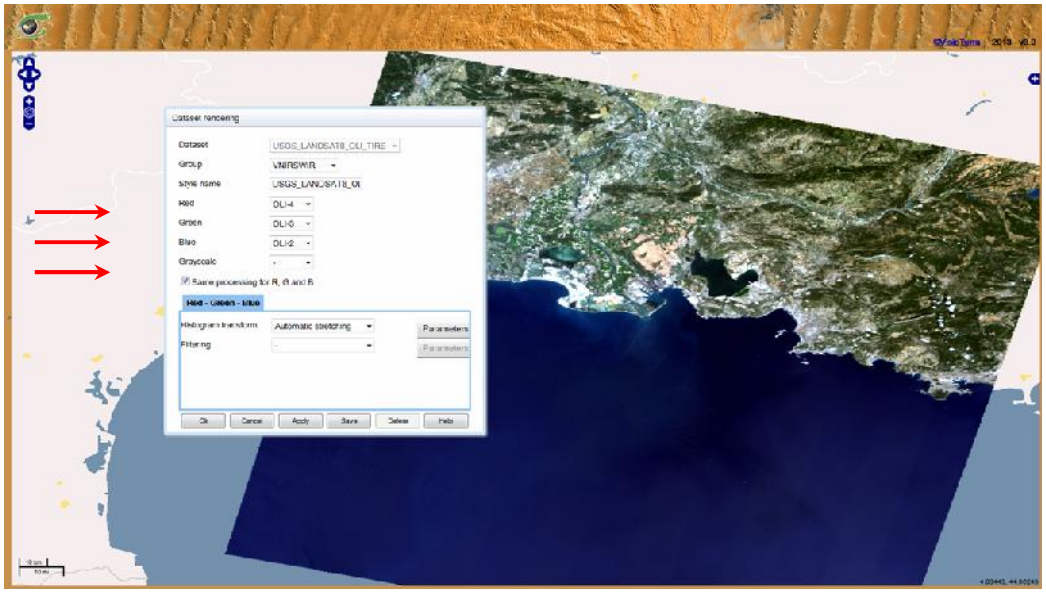
- Filtering:
  - Contrast enhancement - Performs a local transformation to increase the data contrast. This process takes two parameters: sharpening factor and size of convolution window.
  - Convolution - Performs a local transformation to apply a directional gradient. This process takes three parameters: convolution type, gain and offset of the convolution.



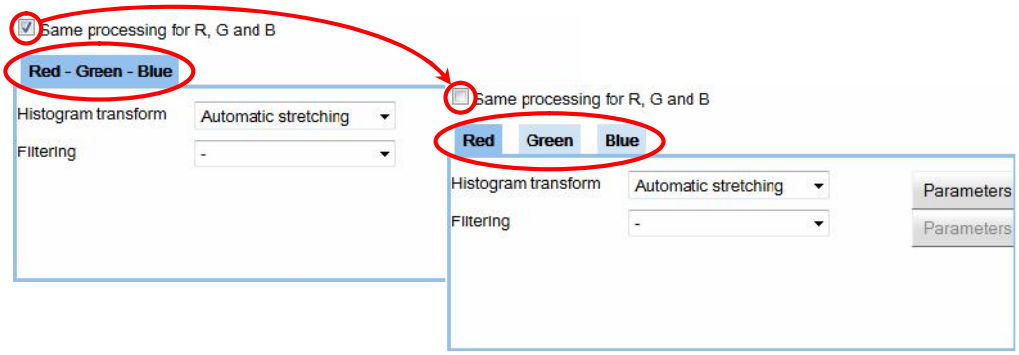
- Look-up table: Select a lookup table. For each of them, users define the left bound, the right bound and if the table is cyclic or not.



A.2.3.2 Standard RGB rendering



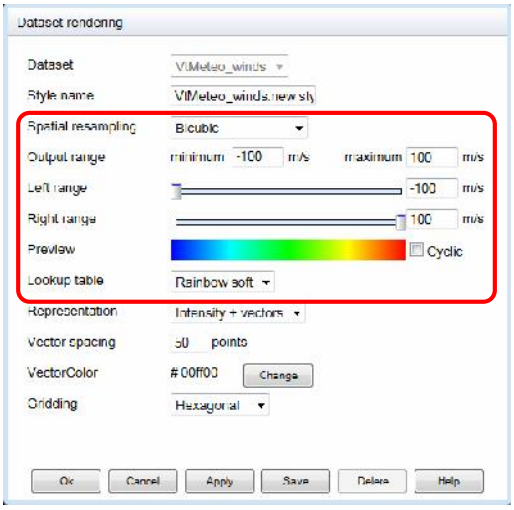
With the check boxes (☑ or ☐), users may define a same rendering for the "**Red**", "**Green**" and "**Blue**" channels or a rendering per channel.



There are two processes: "**Histogram transform**" and "**Filtering**". These processes have the same parameters as of GreyScale rendering detailed in section A.2.3.1.

A.2.3.3 Standard complex field rendering

The rendering parameters of a complex field depend of the field. The attached capture shows rendering parameters for a "**wind field**".



The following parameters are common to all complex fields.

- **Spatial resampling**: defines spatial interpolation method,
- **Output range**: defines the output range of field,
- **Left range**: define left bound of lookup table,
- **Right range**: defines right bound of lookup table,
- **Lookup table**: defines the lookup table and if it is cyclic or not.